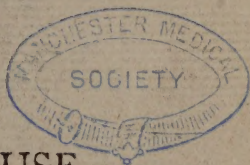


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vol 2

A N
E S S A Y
ON THE
BATH WATERS.

VOL. II.



On their EXTERNAL USE.

In TWO PARTS.

I. On Warm Bathing in general.

II. On the External Use of the Bath Waters.

By WILLIAM FALCONER, M.D. F.R.S.

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T O

JOHN FOTHERGILL,

A N D

PHILIP DELACOUR,

DOCTORS OF PHYSIC,

T H I S B O O K

I S I N S C R I B E D

B Y

Their obliged

And faithful humble Servant,

The AUTHOR.

JOHN FOTHERGILL

A.D.

WILLIAM DELAWARE

WILLIAM DELAWARE

WILLIAM DELAWARE

WILLIAM DELAWARE

WILLIAM DELAWARE

On the EXTERNAL USE *of the*
BATH WATERS.

HAVING in the first volume treated of the internal use of the Bath Waters, I propose in the second to give an account of their external use. But in order to make this subject more generally intelligible, I shall premise something concerning Warm Bathing in general.

Warm Bathing may be defined, the application of a fluid, heated to such a degree as to feel warm to the touch, to the whole or any part of the body.

Definition
of warm
bathing.

It is evident that the above definition admits of great latitude as to the degree of heat extending from that, when the fluid begins to feel sensibly warm to the touch,

B to

On WARM BATHING in general.

to the greatest degree that the human body is capable of sustaining.

Degrees
of heat
which
constitute
a warm
bath.

In my opinion about 80 degrees* of Fahrenheit's thermometer is the lowest point at which we can fix a warm bath. I confess that one of several degrees below it, feels warm to the hand, but always excites a sensation of cold when applied to the body, and probably only feels warm to the hand from our habit of comparing it with other objects of touch which are in general below that degree of heat. Nay, even water of 80 degrees, and as far as 84 or 85, excites a degree of rigor on first entering, and only can exert the effect of a warm bath, if continued in some time. Eighty degrees then of Fahrenheit's thermometer may be considered as the lowest degree of a warm bath, as all below that are more properly temperately cold ones. This may be increased to about 120 degrees, though at this point it is scarcely tolerable to the human body.

* Some physicians place the limits of a warm bath between 62 and 90 degrees of heat.

We have, indeed, accounts of considerably greater degrees of heat being employed among the Russians* and some Indian savage nations; but these accounts are not very accurate, and moreover their manner of life and climate varies so much, that little analogy could be drawn from the practice applicable to the more moderate situations of Europe.

Add to this, that warm bathing is used among them as a customary entertainment as well as medicinally, and they are gradually habituated to sustain greater degrees of heat than we who use it so seldom can endure.

The action of the warm bath on the human body may be considered in two lights; first, as mechanical; and secondly, as acting on the nerves or *solida viva*; and perhaps to these might be added, a third, of its chemical effects when the fluid made use of is absorbed into the body, and thus acts upon the fluids contained in it, by altering their quality or consistence.

Action of
the warm
bath on
the human
body.

* The Russian baths, according to the Abbe Chappé, are heated to 144 deg. of Farenheit's thermometer.

Variation
of the ef-
fects of
warm ba-
thing on
the hu-
man body.

Warm bathing, according to the foregoing definition, is capable of admitting of several variations, which may alter its effects.

As to the
quality of
the fluid.

I. As to the quality of the fluid used.

In some old writers we meet with accounts of * baths of oil, wine, milk, and other fluids ; but these are at present laid aside, and water, either simple, or as impregnated with substances which impart their own proper qualities to it, is now universally the constituent part of all baths.

It appears then that under this head warm baths may be comprehended under the subdivision of

1. Those of simple water ; and,
2. Of water impregnated with substances which impart qualities to it which it did not possess as simple water, called Medicated Baths. Under this head many mineral waters are comprehended.

* Vide Etmuller, vol. II. p. 385.

II. The effects of warm bathing also differ according to the degree of immersion, or proportion of the surface of the body to which the fluid is applied.

According to the degree of immersion

Under this head then warm baths may be considered as general, wherein the whole body is immersed; or partial, wherein only a part of it is exposed to the action of the water, called Topical Baths.

Of this latter kind, the most common are, a bath wherein the body is immersed as high as the waist, called a Semicupium, and one wherein the feet and legs only are immersed, called a Pediluvium.

III. Warm baths also have their effects varied according to the mode of application of the fluid, as whether it be applied in the way of quiet immersion, or thrown upon the body, or any part of it, with a degree of force as in stillicidia, pumps, douches, &c. The latter of these belongs principally to topical baths.

According to the method of applying the bath.

IV. The form likewise in which the bath is applied, alters its effects in a considerable degree, as whether it be applied

According to the form in which the bath is applied.

in its usual form, or as converted into vapour, called a Vapour Bath.

Difference
of specific
gravity of
little con-
sequence.

The difference of specific gravity in the fluid made use of, was formerly thought to vary the effects of bathing in general very considerably; but this has been of late years disregarded in a great degree, both on account of the comparative difference of gravity of the fluids being very inconsiderable, and besides, it is now justly questioned, if the pressure on the body in bathing, on which so much stress was formerly laid, was not greatly over-rated as to its effects,* since in cold bathing we see the same good consequences ensue when the water is applied in a manner wherein the specific gravity could not act in the above-mentioned manner, as when the water is let fall on the body from a dependent bath.

* A great presumption, that the different specific gravity of the fluid used as a bath is of little importance, is drawn from the observation that little change is perceived from the different pressure of the atmosphere, as when the barometer is as high as 30.4, or as low as 28, or on high hills at 20, or even 16, which are much greater proportional differences than could occur in a warm bath, and are likely to be longer continued.

I shall now proceed, in the order above-mentioned, to treat of the effects of warm bathing in general on the human body. But as I mean this only as explanatory of, and introductory to my general subject, which is, to speak of the external use of the Bath waters, it must be expected that I should be as compendious as the subject will admit of.

First, then, as to

The QUALITY of the FLUID.

Simple water is here placed first, as being most commonly used, and as being the foundation of baths in general.

Quality of the fluid.

Under this head I shall consider the effects of the application of warm water to the body, through its several modes of action.

Effects of the application of warm water to the human body.

Water then applied to the surface of the human body, dissolves the mucus naturally adhering to the outer skin, or cuticle, and at the same time washes off all adhering foulness.

Its effects on the surface.

By

By these means it renders the openings of the excretory vessels more free, and procures a more easy and speedy passage for the perspirable matter, or cuticular discharges.

By the same means it clears the skin of other acrid substances, casually adhering to it, which, if suffered to remain, might be productive of much mischief by their stimulating quality. One of the principal of these is the relicks of perspiration which is not exhaled from the surface, and from the heat of the body, and its animal nature, is apt to contract a putrid acrimony.

Hence in hot countries, where this evacuation is very copious, and the heat of the body and surrounding atmosphere are very considerable, frequent ablutions are necessary to prevent the collection of the perspirable matter on the surface of the body, which would be especially dangerous in circumstances which increased its quantity and disposition to a putrid acrimony.

Besides the acrid matter thrown out in form of perspiration, in several disorders
various

various substances collect under the cuticle, and either transuding through it, or passing through the excretory ducts, form a kind of crust * on its surface, highly prejudicial, and tending to increase the disorder. These water dissolves, or washes off, and thus procures a free exit for all the cutaneous discharges which had been obstructed by it.

Water likewise, by softening and relaxing the cuticle itself, must procure a more free exit for all substances collected beneath its surface, by diminishing the rigidity of the sides of the excretory ducts, and thus rendering them more † extensible in diameter as well as length.

* This frequently occurs in the gout.

† I examined the back of my hand with a microscope. The cuticular pores were scarce discoverable, and the prominences between the rugæ appeared shining and rather corrugated. After immersing it 15 minutes in water, about 104 degrees of heat at a medium, I again examined it. The prominences now appeared much more relaxed and soft, the cutaneous pores were easily discoverable, and small drops of perspiration appeared at each of their orifices. The weather was at this time very cold and frosty. The temperature of the room wherein I had sat some time, was about 55 deg. The heat of my hand was about 91½, and I did not feel the least sensation of cold in it when I first examined it. I have frequently observed the pores of the epidermis greatly enlarged
in

On WARM BATHING *in general.*

By the same power it must increase our sense of feeling, which is always more acute or obtuse as the cuticle which covers the part is thicker or thinner, harder or softer. So far as to its effects by its mechanical action on the surface of the body; but in another way they are still more extensive.

As absorbed into the system,

The water is taken up in considerable quantity by the absorbent vessels, plentifully dispersed over the surface of the body. By these it is carried through the lymphatic system*, the humours of which it di-

in the portion of the cuticle separated in a blister, so much as to admit a moderately sized hair. This seems owing to its having been macerated a long time in the serum, and perhaps to its being distended by the fluid collected between the true skin and the cuticle.

* In order to gain some information relative to the quantity of fluid absorbed, I made the following experiment: Into a china bowl about ten inches diameter, I poured about four pounds and a half of water heated to 112 degrees of Fahrenheit's Thermometer; I then weighed the bowl with the water as nearly as possible, which was no easy matter, on account of the constant evaporation; I then plunged my hand into it as high as the wrist, having first chafed it with a cloth, and let it remain there exactly 15 minutes; I then took it out, and carefully wiped it dry with a piece of fine rag, which I had accurately weighed before; I then again weighed the rag, and found it had gained 15 grains; I then weighed the bowl with the water, which had lost in weight 3 ³/₄ lbs. 3 ³/₄ gr. 3. from which, if the 15 grains absorbed by the rag be deducted,

lutes, and washes out the glandular cavities, dissolves the acrimonious parts, and,

deducted, the loss will be 3^{ss}. gr. 18. I next filled the bowl with water of the same temperature to the same height as before, and suffered it to stand (being first weighed) the same time which my hand had been immersed in it, and in the same place as before; on weighing it a second time, I found it had lost of its weight 3ⁱⁱ. 9ⁱⁱ. or 160 gr. If this be deducted from the quantity lost before, it will appear as follows:

	3 ^{ss}	gr. xviii	or	258 grains
Deduct	3 ⁱⁱ	9 ⁱⁱ	or	160
	<hr/>			
Remains	3 ⁱ	9 ⁱ gr. xviii.	or	98 grains.

for the quantity absorbed.

The heat of the water in both cases was diminished nearly alike, viz. to about 91 degrees and a half.

The above experiment was tried two hours before dinner; but in order to see the effects of taking in food, I repeated it the next day two hours after dinner, when the quantity absorbed, after making the above deductions, amounted only to 43 grains. I then tried the same experiment on a person of a more tender frame and habit of body, wherein the quantity computed to be absorbed was, two hours before dinner, 64 grains, and two hours after dinner 38 grains.

I tried the above experiment in warm weather, when the thermometer stood between 76 and 80 degrees; but at that time the perspiration was so great as to render the weight of the whole several grains greater, notwithstanding the large evaporation. The hand, in the above experiments, felt as if it was swelled, and appeared to the sight obviously enlarged. The heat of it was a little increased, and the pulse in that arm more full, but not quicker, than in the other.

Dr. Alexander found, according to his experiments, a much larger quantity of fluid to be absorbed than is here mentioned; but he did not, as appears by his experiments, account for the quantity lost by evaporation, which would probably be more in weight in his experiments than in those now recited,

On WARM BATHING in general.

by its dilution, renders them less stimulating, and fits them to be carried off by the proper excretions.

cited, as the specific gravity of the water was increased by addition of nitre, which he proved to have evaporated with the water in a large proportion. In the first of the experiments here recited, the quantity absorbed by the whole body, supposing every part of it to absorb equally with the hand, and that the surface of the latter to the whole body, is as 1 to 60, will be 12 oz. \S ii. in the second \S v. \S iii. in the third nearly \S viii. and in the fourth \S iv. \S vi.—These quantities, though greatly inferior to what Mr. Alexander had calculated, are yet considerable enough to be taken into consideration, especially when the particular qualities of the fluid employed are depended on. I am much inclined to suspect this absorption would be greater in many cases wherein we would wish to employ it, as in feverish disorders, attended with a dry skin, since I have found the absorption much the greatest when the perspiration was least.

This conjecture seems probable from an experiment by Dr. Thomas Simpson, wherein the absorption must have been much greater than what occurs commonly in our trials.

Cum homo adolescens, febre correptus, cui accesserat diarrhœa, cum extremo stupore sensuum nihil plane ore haurire vellet; quanquam immoderato æstu totus torresceret, quo humectaretur, jubeo in aquam egelidam immergi pedes: quo facto, protinus aquæ mirum cerno in vase decrementum, deinde ejusdem vix coloratæ, more cataractæ per anum effusionem.

Abbe Chappé mentions, that he found the cloaths he wore before he went into the bath too little when he came out of it.

Dr. Parr's experiments mention the face being red and tumid during the stay in the bath, and that this increased greatly as the heat of the water was augmented above 96 degrees; but the increase of the vessels on the surface of the body was not perceived 'till the heat was raised to 102 degrees.

I have frequently heard a sensation of fullness and distention of the vessels of the head complained of by those who use the warm bath, during their stay in it; and have observed
the

The foregoing effects are in part applicable to water of any temperature, but are considerably greater as the heat is increased to the degrees mentioned as the utmost standard of a warm bath.

The warm bath likewise acts very powerfully in rarefying the animal fluids; and it may have this effect in some measure, even though not above the degree which is commonly esteemed the general heat of the human body, viz. 96 degrees of Fahrenheit's thermometer.

As rarefying the animal fluids by its heat.

It may at first sight seem extraordinary, that a fluid of 96 degrees of heat should, without any chemical operation, but merely by being brought into contact, increase the heat of one which is almost constantly of a greater degree; yet this seeming paradox may be easily reconciled, if we consider that the body is, in the general state of the atmosphere, exposed to a degree of heat greatly below animal heat. The body

the vessels of the head and face greatly enlarged, altho' the water never rose so high, which proves it was not owing to any relaxation of the cuticle, or of the absorbent or exhalant vessels by the contact of the water, as some have supposed.

then

then goes on losing, and the circumambient air gaining heat continually, and would in time be brought to one temperature, were it not for the vital principle which seems continually by means hitherto very imperfectly explained, but which seems most probably owing to the nervous power generating a fresh degree of heat.

Now this loss of heat from the body will be more or less in proportion to the temperature of the surrounding medium: therefore, if water, hotter than the usual temperature of the air, be closely applied to the surface of the body, it is obvious that the loss of heat must be less, and consequently the heat itself of the body increased above the usual degree; and this heat, and consequent expansion of the contained fluids, will be greater as the heat of the surrounding fluid is increased.

The more immediate effect of heat externally applied in this way, is upon the fluids contained in the vessels that lie nearest the surface of the body; but if this heat be continued some time, the fluids of the whole body become rarefied in their turn in the course of circulation. To this
it

It is ascribed, that the veins in some degree appear turgid during warm bathing, or in a warm air, and appear diminished in the cold*.

* In order to throw some light on the important question of the expansibility of the blood by heat, the following experiment was made :

I procured a glass vessel to be made in form of a thermometer, with a bulb which held between 8 and 9 ounces, and a neck about 12 inches long, and about $\frac{1}{6}$ of an inch diameter. I filled this about $\frac{3}{4}$ into the neck with blood, which was taken from a person in health, and conveyed immediately into the vessel from the arm by means of a small funnel fixed into its neck. During the time of its filling the glass vessel was set in water, from 98 to 100 degrees of heat, which reached above 4 inches above the bulb of the glass; I then corked up the end of the tube, and added as much more hot water to that in which it stood, as raised the thermometer to 120 degrees. I suffered this to cool 'till it fell to 96 deg. and measured the different heights to which it had risen, I found it had risen at 120 degrees about $\frac{1}{5}$ of an inch higher than at 96 degrees, which I found, by accurately measuring the quantity, to be $\frac{1}{567}$ part of the whole bulk.

I tried the same experiment with water, and found it more expansible than blood in the same degree of heat nearly as 3 to 2. I repeated the former of these experiments several times, and found very little alteration.

These experiments seem to correspond in a great measure with those made by other authors. Sauvage found blood only increased in bulk $\frac{1}{200}$ part even by a boiling heat, and both he and the Professor at Upsal deny that it is reduced into less compass than it usually takes up in the body, even by the greatest degree of cold.^a And Haller asserts, from his own

^a Frigus glaciale sanguinem in minus spatium non comprimit.

Such are the effects of the application of warm water to the human body, con-

own experience, that no perceptible augmentation of the bulk of the blood was discernible, even when the heat was raised to the boiling point.

Were we to trust to what might at first view be concluded from these experiments, all our theory concerning the expansion of the blood by heat is at once destroyed; yet the apparent increase of the bulk of the vessels, and of the whole body, the sensation of fullness and distention, and the proneness to hæmorrhage, which attend the use of the warm bath, seem difficult to be accounted for on any other principles.

An ingenious writer, whose name has been before mentioned in this work, and who will, I doubt not, do honour to the profession, has endeavoured to reconcile this difficulty, by ascribing an elastic quality to the blood, supposing it to be in a compressed state in the vessels^b; and that when this pressure is removed by the relaxation of the sides of the vessels, the blood expands by its elastic property, and in this way seems to enlarge its bulk. But this theory is, in my opinion, as difficult to be maintained as the former. Haller relates, that it is found by experiment, that the blood could not be compressed into a smaller volume by a column of mercury of 36 inches, which is a much greater pressure than it could be supposed liable to undergo from the vessels of the body. Besides, other elastic fluids have this quality much increased by heat, which does not, by the above-mentioned experiments, appear to be the case with blood, whose bulk is scarce increased by it, even when all pressure is removed. But I am much inclined to suspect that the above experiments, which seem to weigh so strongly against the expansibility of the blood by heat, are more specious than satisfactory to prove the point in question. All experiments of this kind, except very frequently repeated, lead to hazardous conclusions;

^b Dr. Parr's Thesis.

sidered as an inanimate machine; but if we consider it as possessed of a living sen-

conclusions; and frequently, even when made in the best manner possible, it is difficult to draw any certain deductions from them. In the present case, I doubt if we can determine any thing with certainty concerning the nature of the blood from experiments made upon it when let out of the body. The blood undergoes a great change by coming into contact with the external air, and probably a degree of decomposition, as appears from the separation of its component parts. During the flow of the blood from the vein into the vessel which receives it, several of its volatile parts escape, and among them a portion of elastic air, probably of the inflammable kind, as appears by some experiments, on which the expansibility of the blood by heat seems in a great measure to depend. Moreover, it is extremely difficult to convey the blood into a vessel of such a form as will measure it accurately without its coagulating. I repeatedly tried the experiment with all the precautions I could suggest, such as receiving the blood immediately from the vein into the vessel I had contrived to measure it, which last was at the same time immersed in a vessel of water as near as possible to the degree of animal heat. Yet I never could, even by many repeated trials, preserve it uniformly fluid, but that some separation had taken place, though very incomplete.

When I tried a large clear vial for that purpose, I found I could preserve the fluidity pretty well, but that form did not admit any accurate admeasurement of the increase or diminution of the blood's bulk. But it seems likely that air is not the only volatile elastic substance that is thus exhaled from the blood. The volatile alkali, or some volatile saline substance nearly resembling it, seems to enter into the composition of the volatile part evaporated. Haller mentions the halitus of the blood, when carefully received into glass vessels, as being of a saline taste, and rather of a foetid smell, resembling urine, which was increased when the animal was disordered, and more remarkable in carnivorous than herbivorous animals. All which are characteristic marks of the volatile alkali, which is itself a very elastic substance, and has this quality greatly

tient principle, we shall find the effects of warm water upon it much more remarkable.

greatly augmented by heat. I think then on the whole that as many circumstances concur to prove the expansion of the blood by heat while in the human body; and as the arguments which are adduced to disprove it were drawn from experiments made on the blood in a different state and situation from what it is while circulating in the vessels, that nothing can be concluded from them to prove the falsity of the former hypothesis. But at the same time that I think the expansion of the blood by heat the most rational and probable method of accounting for several of the effects of warm bathing, I would not be understood to assert that it is demonstratively proved to be true, but only that it is, in my opinion, the most likely to be so of any that I have seen. Some light might perhaps be thrown on this important subject by experiments made on brute animals, by transfusing their blood through a pipe into a vessel with the air exhausted from it, if possible, and closing it immediately, so as not to let it come into contact with the air, and then examining the effect of heat in expanding it. Yet I question if this would be decisive, as there is something else necessary besides the exclusion of the air, and a certain degree of heat to keep the parts of the blood in their natural state, and preserve its fluidity. This is proved by cupping, where the blood is generally found coagulated before it could have come into contact with the air, and, according to Haller, the blood has been found coagulated even in the vessels of a living animal. This seems to be the case sometimes with polypi, tho' the time at which these are formed is not very clear whether before or after, or perhaps in the agonies of death. Haller ascribes the formation of polypi to the cessation of the blood's motion or circulation, which, if we judge from the appearance of the blood out of the body, seems very plausible; but I am well assured that this alone is not always sufficient to produce it, since I have seen the blood continue perfectly fluid for above twelve hours after death in a person who died apoplectic; and I have been well informed that this very commonly happens with those that die suddenly. Besides, many have continued in a syncope without any marks

state,

The first effect of the warm bath seems to be that of a stimulant to the system in general.* As stimulant.

The heat of the body is increased†, the pulse accelerated and made stronger, the
C 2 body

of the blood's circulation, and under water, or in a strangled state, a much longer time than the blood takes to coagulate when out of the body, and have recovered again without any suspicion or signs of the formation of polypi on the renewal of the blood's motion.

* Heat seems to be the most universal stimulus in nature to the nervous power, without a certain degree of which animal life cannot subsist. No animals, with which we are acquainted, are able to live when the temperature of their bodies is reduced to the degree at which water congeals, or 32 degrees of Fahrenheit's thermometer; and much the greatest number are destroyed, or at least rendered torpid, by a much less degree of cold; and several when the height of the thermometer is but a few degrees below the middle temperature of the air. Dr. Alexander found in his experiments, that no animalculæ could be produced in his putrefactive or fermenting mixtures, except in the summer months.

† The stimulant effects of the warm bath are scarce discernible until the heat is raised to 98 degrees, according to Dr. Parr's experiments.

98 gr. pulsus frequentia paulum aucta.

100 gr. pulsus frequentia paulatim aucta est ut post xxv minuta 72 micaret qui in statu naturali 60 in minuto micaret. Plenior idem cito evadebat.

102 gr. pulsus multo frequentior erat, post xxx minuta 100 vibrationes in minuto ostendebat cum aliter 68 ostendisset.

104 gr. post xx minuta pulsus & calor tantum mutabantur quam in experimento proximo post semihoram.

106 gr. pulsus & calor tantum augebantur post xv minuta quam in experimento proximo post xx minuta. Parr's Thesis.

On WARM BATHING in general.

body is swelled, and the blood vessels on the surface appear distended.

These effects are probably owing principally to the stimulus of the heat on the nervous system, and in some measure to the rarefaction of the fluids, and consequent distention of the vessels, which, by stretching their fibres, must likewise act in some degree as a stimulus. This effect of the warm bath is greatly increased in proportion to the heat, especially when this exceeds 96 degrees. Thus I have found the above effects very inconsiderable when the heat was not raised higher than 96 degrees, but very remarkable when increased to 100, or even 98.

As sedative or antispasmodic.

Another effect of the warm bath, not so immediate, but what generally succeeds to the foregoing, is that of sedative or antispasmodic. This may seem opposite to the foregoing, but not on that account incompatible with it. 'Tis observed of the warm bath, that when above the temperature to which the body is usually exposed, and at the same time not exceeding the natural heat of the human body, it always

ways excites a pleasing sensation,* which, like all of that kind, excites a degree of relaxation (or at least what seems to be so to our sensations) of the nervous system. By expanding the circulating fluids, it overcomes the spasmodic contraction of the containing vessels, and thus renders the circulation more equable, and by the same means takes off spasmodic disorders that arise from inanition. By causing a greater flow of blood through the head,† and expanding the vessels there, it disposes to sleep,‡ provided the stimulus be not so

* Such remedies as relax, and at the same time affect with an agreeable sensation, the muscular fibres and nerves, rendering them thereby less likely to suffer from irritation, viz. the warm bath, femicupium, and pediluvium. Whytt's works, p. 681.

The warm bath affects the nerves with an agreeable sensation, removes spasms in the small vessels, promotes an equable circulation, gently expands the fluids, and consequently fills the whole vessels of the body. Ibid.

Warm water, by its particular action on the nerves to which it is applied, renders the whole system less sensible of any irritation. Whytt's works, p. 120.

† Balnea (calida scilicet) ad somnum blandum disponere in foro medico est notissimum, quod tamen non alia ratione fit quam expansionem ipsis humoribus inducant, unde etiam habitum corporis inflatum atque turgidulum reddunt. Hoffman, vol. vi. p. 84.

‡ Probably this is the foundation of the soporific effects of wine and spirituous liquors.

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great as to produce any inflammatory irritation; and this effect of the warm bath is greatly assisted by the pleasing sensation it occasions.

As diaphoretic.

The warm bath likewise acts very powerfully on the secretions of the body, and particularly the perspiratory discharge.*

How it brings this about will be easily conceived, if we consider the account that has been before given of its effects in softening and relaxing the cuticle, and washing off all external foulness that might clog up or obstruct the mouths of the exhalant vessels; of its increasing the quantity of the fluids by absorption, and their bulk by rarefaction; and moreover of its stimulus, joined to a sedative quality, which is observed to promote this discharge very particularly. The care to keep the body

Warm baths procure a greater flow of warm rarefied blood through the head, and thereby dispose to sleep. *Med. Essays, Edinb. vol. vi. Dr. Stevenson on the Pediluvium.*

* By Dr. Parr's experiments, perspiration (insensible, I suppose,) was greatly increased by the warm bath, when at 96 and 98 deg. of heat. When raised to 100, 102, 104, or 106, the sweat became in the first perceivable, and grew in each degree gradually greater, 'till in the last it flowed in full streams from the face.

warm,

warm, after coming out of the bath, likewise contributes to promote this effect of it in a greater degree.

The warm bath sometimes proves diuretic. If the body is in a bibulous state, and no particular care taken to promote perspiration by warmth of cloaths or warm liquors, more water may be absorbed than passes off by perspiration, which may then find its way by the urinary * secretions. In cases likewise where the last-mentioned discharge is but small from any constriction of the secreting organs, the warm bath generally increases the secretion, and thus acts as a diuretic by its antispasmodic quality.

As diuretic.

I have likewise often seen the warm bath greatly increase the discharge by expectoration. This may be easily conceived when we consider how immediately the warm bath acts on the circulating fluids, and that the whole mass of blood circulates through the lungs; so that its increased bulk, heat, and accelerated motion,

As expectorant.

* Dr. Parr did not find any diuretic quality in the warm bath when raised above 96 degrees.

must

must be very sensibly felt there, and increase those secretions.

As salago-
gogue.

The salivary discharge likewise is much increased by warm bathing, as is evident from its effects in quenching thirst, and the discharge from the nose, augmented by the same means. This, I think, may be accounted for on general principles of the universal stimulus occasioned by the warm bath, the absorption of watery fluid, and the increased bulk and motion of the blood, which must undoubtedly increase the secretions in general.

As emme-
nagogue.

Warm bathing also has been found, by experience, to promote the menstrual discharge very powerfully. Obstructions of this kind are frequently owing to inertia of the uterine system; and in these cases, warm bathing, by its stimulus on the nerves, its accelerating the circulation, and increasing the bulk and quantity of the fluids, is likely to prove emmenagogue. When the obstruction is owing, as frequently happens, to spasmodic constriction, warm bathing, by its sedative or antispasmodic quality, is found of the greatest service in relaxing the vessels, and procuring a free passage for the accustomed evacuation.

INDICA-

INDICATIONS *of the* WARM BATH.

Such are the general effects of the warm bath on the human body. I shall now draw some inferences from them relative to the indications to which it is adapted.

Warm bath when indicated.

From the detergent effects of the warm bath in cleansing away foulness, and acrid irritating substances adhering to the skin, we may see the good effects likely to result from warm bathing in all cutaneous disorders arising from that cause. By a like power, the warm bath procures an exit for any matters that may be accumulated between the true skin and the cuticle, or in the vessels of the skin itself, whose passage outwards may have been obstructed by foulness, blocking up the excretory ducts which pass through the cuticle.

When indicated as a detergent.

The warm bath also, by softening and relaxing the cuticle itself, and the parts immediately connected with it, must render the cutaneous evaporations more free. On these accounts it has been found an efficacious remedy in cutaneous disorders in general; since most of them arise from retention of that discharge, others cause

In cutaneous disorders in general.

it

tic onsequentially, and all are aggravated by it.

In our climate, indeed, where perspiration is moderate, we do not see many disorders that can be attributed to this cause; as the relicks of this evacuation remaining on the surface of the body, or in the cutaneous vessels, seldom continue long enough to contract any putrid acrimony. But in hot climates, where this discharge is very considerable, and the putrefactive disposition much stronger than among us, it seems to be a principal source of these complaints, which are much more frequent there than in our climates. What strengthens this opinion is the custom of frequent ablutions, which is almost universal among the inhabitants of hot climates, owing, in all probability, to a natural instinct; and likewise the observation that, since cleanliness has been more attended to, cutaneous disorders have been observed even among us to be less frequent and contagious, and to admit of easier cure.

In all probability, several Jewish religious ceremonies of this kind in the Jewish law,

law, and among the Mahomeddians and other Eastern nations, were political in their intention, in order to inforce, with more energy and efficacy, a custom which appears so necessary to the health of the inhabitants.

It is not unlikely, that the efficacy of warm bathing in leprous disorders is owing, in no inconsiderable degree, to its detergent quality, in cleansing away the foulness which obstructed the perspiratory discharge, and by its relaxing and softening the cutaneous pores, and thus rendering the passage through them more pervious.

In the lepra.

I am likewise inclined to attribute the good effect of warm bathing in the decline of gouty complaints in some measure to the same cause.

In the gout.

In this disorder, towards the close of the paroxysms, there is frequently thrown out on the skin of the extremities an exudation in form of a whitish powder or branny scurf, which seems to have transfused in a thicker form than that of perspiration. As the cutaneous pores seem
to

to be the passage intended by nature for the evacuation of the gouty matter, it is evident that the keeping these in a pervious state must be of the greatest consequence, and the use of the warm bath in this case will be evident from what has been before said of its effects in this way.

Though the detergent effects of the warm bath are more immediately serviceable in those disorders which seem to owe their rise to foulness adhering to the surface of the body, or lodged under the cuticle or in the perspiratory ducts, it is obvious that they must be of great consequence in all cases where a free perspiration is necessary, by cleaning the pores through which it is to pass.

I shall speak more of its effects in complaints of this kind when I come to treat of it as increasing the secretion itself.

So far as to the indications of the warm bath as a detergent to the surface.

When indicated on account of the fluid absorbed.

I shall next speak of it as giving occasion to an absorption of watery fluid into the vessels and habit of the body.

From

From the account before given of this effect of the warm bath, it is evident, it must be a remedy of great efficacy in many disorders whose cause lies in the animal fluids. Where the consistence of these in general is too thick, it dilutes them, and thus obviates complaints arising from lentor. Where acrimony prevails, it renders that less stimulant by its dilution; and, by its dissolving the acrimonious parts, fits them to be carried off by the proper excretions. On this account, probably, among others, warm bathing has been found of great service in the Lues Venerea, the contagion of which seems to reside particularly in the fluids; and it is not unlikely that the relief of the Scurvy by warm bathing may be in part owing to a like cause.

In the
lues vene-
rea.

In the
scurvy.

By necessarily passing thro' the glands in the course of absorption, it washes out their cavities, and dissolves any acrimony lodged there; and thus, as well as by exciting their action in its passage through them, contributes greatly to remove obstructions of the glandular kind.

In gland-
ular ob-
structions.

On

In the
scrophula.

On this account the warm bath has been found singularly serviceable in the Scrophula, whose seat lies in the lymphatic glands, and seems to be in its nature a combination of acrimony with obstruction.

In mesen-
teric ob-
structions.

By the like powers, the warm bath has been found remarkably serviceable in obstructions of the Mesenteric glands, and in liver complaints attended with an hardness and biliary obstruction.

In glandu-
lar com-
plaints in
general.

In short, as nearly all glandular complaints seem to be produced by, or attended with obstruction, the warm bath may be said to be generally serviceable in them, provided it can be used with safety in respect of its stimulus on the nerves and system in general.

When in-
dicated on
account of
its rarefy-
ing qua-
lity.

The warm bath seems in some cases to be of service by its rarefying effects on the fluids. In complaints arising from inanition, the warm bath often proves an effectual relief; the increase of the fluids' bulk occasioned by its means supplying the deficiency in quantity.

By

By the same powers, in a great degree, it is of service after large evacuations, when the body is debilitated, and the vessels relaxed for want of their accustomed quantity of fluid. It proves, by the like quality, a very efficacious emmenagogue when that discharge, as frequently happens, has been suppressed by excessive evacuations. I am likewise inclined to attribute much of the antispasmodic effects of warm bathing to its rarefying power*, owing to its distention overcoming the spasmodic constriction, and thus restoring the equilibrium throughout the body. I imagine that this is in a great degree the cause of the efficacy of the pediluvium † in nervous head-achs, which often seem to arise from weakness and inanition.

In weakness from inanition.

In menstrual suppressions.

So far as to cases wherein the warm bath is indicated on account of its mechanical

* It is very probable that the deobstruent qualities of the warm bath are owing in a great measure to this effect of it on the fluids, especially, as Dr. Oliver observes, when we consider that it is conjoined with a relaxation of the solids in general, and the sides of the vessels rendered soft, and yielding to the distending force of the rarefied humours.

Oliver on warm bathing in gouty cases, p. 16.

† Vide Dr. Stevenson's paper on the warm pediluvium, Edin. Med. Essays, vol. VI.

action on the human body : I shall next speak of it as indicated from its effects on the vital and nervous system.

When indicated as a stimulant.

I have before observed that the warm bath proves a powerful stimulus to the system in general, accelerating and raising the pulse, exciting the secretions, and quickening the sensations. On these accounts it is indicated (under certain limitations) where these effects are desirable.

In palsy.

Among disorders that require such effects, paralytic * complaints are among the principal. The use of this remedy was generally acknowledged in this disorder, until the late Dr. Mead (on what grounds I know not) declared it noxious universally in cases of this kind. Later experience has, however, confirmed the testimony of former ages in its favour ; and it is, I believe, now generally acknowledged, that Dr. Mead's† opinion was ill grounded.— From the sensible effects of the warm bath

* Balnea Vaporum, immersiva, juvant. Boerhaave Aph. 1069.

† Calidæ Immerfiones paralyticis omnibus nocent. Mead Monita & præcepta medica.

on the body, we have a great presumptive evidence in its favour; as all the effects it produces are such as our endeavours should contribute to produce and promote, whatever means may be used for that purpose.

Another complaint, wherein the warm bath seems to be particularly serviceable on account of this quality, is the Chlorosis,* which is always attended with an inertia of the vascular system, and frequently of the nervous one, both of which it contributes greatly to obviate.

In the
chlorosis.

Warm bathing likewise is of great service on the same account in all menstrual obstructions, attended with languor and inertia of the system, to which, in all probability, they are frequently owing; and more especially where this discharge has ceased in consequence of some extraordinary evacuation. In these cases warm ba-

In men-
strual ob-
structions.

* *Thermarum in nostro morbo magnus est usus. Preferant enim non solum a chlorosi, sed ipsam curant. Hoffman, vol. vi. p. 396.—Vide also Hoffman, vol. v. p. 321.*

The *femicupium* is recommended by Sauvage in this complaint. Vide class 10. genus xxxiii.

Warm baths are advised by Boerhaave in this disorder. Aphor. 75.

WARM BATH *when indicated.*

thing, by its stimulus on the nervous system, and by its sudden effect in increasing both the bulk and impetus of the fluid, proves * a quick and efficacious remedy.

In cachectic cases.

The warm bath is, by the same quality, an excellent remedy in many disorders of the viscera, such as are commonly called cachectic, and which seem to owe their rise to obstructions of the mesenteric glands. These, at their beginning, are generally accompanied with languor of the vital powers, and listlessness to motion, together with a slow circulation, and diminution of the natural heat.†

In the first stage of this disorder, when the obstruction is recent, before any fixt pain, inflammation, or schirrhus, come on,‡ this remedy is extremely serviceable

* Optimum vero remedium sunt thermæ. Hoffman, vol. v. p. 320. de fluxu mensium inhibito.

† Virium vitalium languor, lentior circulationis impetus, minor calor. Sauvage, descriptio cachexiæ, class x. ord. 2.

‡ Warm baths are recommended by Sauvage in this disease.

Utilius his frequens balneum est. Celsus, lib. 3. cap. xxii.

Warm baths are advised by Boerhaave in this disorder, aph. 1178; and by Hoffman, de cachexia & chlorosi.

in quickening the circulation; thus increasing the impetus of the blood, (which contributes to remove the obstruction) and at the same time exciting the action of the nerves, and restoring the natural heat.

The stimulant effects of the warm bath seem frequently to be of great service in icteric and other liver * complaints, which are generally, when recent, attended with similar symptoms to those just mentioned; both indeed probably arising from the bile being regurgitated into the course of circulation, which generally happens in some degree in cachectic disorders, and which seems to exert a narcotic influence on the nervous system.

In liver
com-
plaints.

It is not improbable that the costiveness, which so frequently occurs in icterical cases, may be owing to this effect of the

* *Pigritia animi languor.* Sauvage, *descriptio auriginis.*
Segnitias, lassitudo. Sydenham.
Imbecilles sunt, ignavia cedunt, animo demissi. Aretæus.

Warm baths are advised by Sauvage in *aurigine frigida*, class x. ord. 6. gen. xxx.

The warm bath is advised by Celsus, *de regio morbo.*

Warm baths are advised by Hippocrates, principally at the *beginning* of icterical complaints, and afterwards during the course of the disorder.—*De locis in homine*, cap. xl.

bile on the nerves, as well as to the want of its stimulus in the intestines.

In counteracting these effects the warm bath is likely to be of considerable service, and may be used with safety, if tried before any great degree of pain or inflammation have been produced in consequence of the obstruction.

In hypochondriacal disorders.

The stimulus of the warm bath seems to be, in some degree, the foundation of its use in hypochondriacal complaints. This disorder, whatever its immediate cause may be, is always conjoined with a degree of torpor of the nervous system, of the alimentary canal especially; and on this the use of stimulant substances in this complaint is founded.

The warm bath here furnishes an admirable general stimulus to the whole system, which is more universal and full as efficacious as any internal medicine; and has this additional advantage, that it may be longer continued without losing its effect.*

* The hot bath is advised by Boerhaave, vide aph. 1103. And vide Van Swieten's Commentary on the above. And by Alexander Trallianus, lib. 1. cap. xvi.

By the same quality the warm bath proves often an effectual cure for sterility in both sexes, and is one of the safest as well as the most effectual of the remedies used for that purpose.

In sterility.

Such are the general cases wherein the warm bath is indicated as a stimulant. I shall next speak of it with regard to its sedative or antispasmodic qualities. One of the most simple complaints of this kind is the * locked jaw, in which the warm bath has been of eminent service.

When indicated as antispasmodic.

Several kinds of spasmodic colics, † the colica pictonum especially, are also remarkable instances of its efficacy in this way, which it evidently relieves by taking off the spasmodic stricture on the intestines accompanying these disorders; and probably, by the like quality, it often proves

In the colica pictonum, and flatulent choleric.

Nullus vero morbus est qui plus auxilii & levaminis a balneorum usu percipiat quam affectio sic dicta hypochondriaca. Hoffman, vol. iii. p. 212.

* Vide Medical observations, vol. ii. p. 148.

† Ex aqua tepida sæpe reiterata semicupia profunt. Tronchin, de colica pictonum. p. 147.

Balnea etiam profunt si tepida. Tronchin, p. 153.

Huxham de colica damnosiorum, p. 29, 30, 31.

an effectual remedy for the flatulent colic, to which hypochondriacal constitutions are subject.

In the
bilious
colic.

The bilious * colic likewise has been eminently relieved by the same means in the most desperate circumstances, and that so suddenly, as to leave no room for supposing its effect could be owing to any other quality.

In short, it appears by the testimony of the best writers to be an approved remedy in all colicky † complaints, attended with

* Quisque ex junioribus medicis jam facile perspiciet ex omni remedium genere, nullum tantâ valere efficaciâ tonum naturalem intestinalis canalis restituendi, ipsasque spasticas stricturas harum partium mitigandi, & motum retrogradum qui ad superiora tendit reparandi, & ad inferiora convertendi, quam calidum humidum & interius & exterius rectè adhibitum. Hoffman.

† Propter laudatissimum hunc effectum (antispasmodicum scilicet) balnea, in iis morbis qui identidem a stricturâ & spasmu partium imi ventris proficiscuntur, præcipuum curationis punctum absolvunt. Hujus generis sunt omnes intestinorum dolores, tormina, atrox colica convulsiva.—Hoffman, de balneorum aquæ dulcis usu in affectibus internis.

Hippocrates advises the warm bath in the colic to procure a passage. De victu acutor. cap. lxi.

Vide Edinb. medical essays, vol. iii. p. 357.

Semicupia profunt. Sauvage, colica biliosa, class. 7. g. 22.

Cælius Aurelianus advises warm bathing to be repeatedly used in this complaint, p. 261.

Utatur balneo calido. Celsus, remedia ad coli dolorem.

pain

pain and tormina of the intestines; provided always that proper evacuations by blood-letting be premised, should any inflammation be present.

By the same quality it proves an effectual relief in several kinds of asthma* of the spasmodic sort.

In the spasmodic asthma.

It is likewise of the greatest service in calculous complaints, when any stony concretions are passing through the urinary passages, † especially the ureters, which

In calculous disorders.

* Warm bathing is advised in the asthma by Cælius Aurelianus.

Sauvage advises the use of warm bathing in the asthma hypochondriacum, and asthma convulsivum, and asthma metallicum, which are of this kind.

Hoffman advises the use of the warm bath in the convulsive asthma. De asthma convulsivo. Vol. ii. p. 100.

† Dolorem sublevant balnea. Sauvage de Nephralgia calculosa.

Balneatio bis in die necessaria est ante purgationem. Sauv. de nephritide calculosa.

Aretæus advises the warm bath in such cases with this intension. Vide Curatio renum acuti affectus.

Peculiari etiam modo solatur eos qui a renali calculo magnos sustinent cruciatus. Nam si paulo grandior angustis ureterum viis inhærescit calculus, spasmi non modo ductus urinarios, sed omnes quoque totius corporis partes nerveas penetrant. Nihil hic est consultius quam corpus temperato balneo immittere, ut blando ejus tepore stricturæ & contractiones partium remittant. Hinc non modo dolor mitigatur, sed & viis laxioribus redditus, facilius fit calculi transitus atque expulsio. Hoffman, vol. iii. p. 213.

often

WARM BATH *when indicated.*

often irritate so violently as to cause great pain and strong convulsive contractions of the urinary ducts.

The warm bath allays these admirably ; and by this means frequently procures a passage for the stone which could scarce be attained by any other means.

In spasmodic suppressions of urine.

The warm bath has also been found of great service on the same account in spasmodic suppressions of urine ; either symptomatic, as sometimes happens in the colic, or in consequence of some ulceration or stimulus (as from too violent diuretics, cantharides especially) or from an original affection of the urinary organs.

In biliary calculi, and spasmodic obstructions of the biliary ducts

By the same means the warm bath proves an effectual remedy in promoting the passage of biliary calculi, which may be lodged in the gall ducts, * into the intestines.

* Sauvage advises a warm bath for this purpose. Nosol. Meth. Hepatalgia calculosa.

Warm bathing seems to be recommended by Hippocrates with this intention. De locis in homine, cap. xii.

Celsus likewise advises the warm bath in this disorder.—De regio morbo.

Temperate baths are advised by Hoffman to take off these spasmodic contractions, and particularly to facilitate the passage of gall stones. De cachexia ictERICA, vol. ii. p. 233.

The

WARM BATH *when indicated.*

41

It is also of great efficacy in ictical cases, when the biliary ducts are spasmodically contracted and the passage of the bile obstructed in that manner.

In * menstrual obstructions, when the stoppage happens, as is most commonly the case, from a spasmodic affection of the uterine vessels, the warm bath is frequently of great service; especially when proceeding from some sudden and evident cause, as affections of the mind, cold; or some other external cause.

In menstrual obstructions.

The warm bath has likewise been extremely serviceable in preventing miscarriage, which frequently happens from those spasmodic affections of the uterine system, which are apt to come on at certain periods during the time of pregnancy.

In preventing abortion.

To this quality likewise is owing the good effect of the warm bath in the ner-

In the nervous head-ach.

The hot bath is recommended by Cælius Aurelianus.—*De aurigine.*

* Hippocrates advises frequent bathing in hot water in menstrual obstructions. *De morbis mulierum. L. II. cap. xxvii. Ibidem, cap. xxxviii.*

Vide Van Swieten's commentary, vol. iv. p. 446.

Home, princip. medicinæ de mensium obstructione.

VOLUS

vous head-ach, especially when it affects one part more than the other, as in the hemicrania.*

In muscu-
lar con-
tractions.

The warm bath also has been found eminently serviceable in rigid contractions of the muscles.† These often arise from various causes, but the warm bath has been found almost universally of use in them. It particularly relieves those which follow fits of the gout or rheumatism, and are generally attended with considerable pain. It is likewise of the greatest service in those contractions, which sometimes succeed violent colics, especially that of Poictiers, which seem to be of the paralytic kind.‡

Nor is the warm bath less efficacious as an antispasmodic in diseases of the system

* Capitis gravitatem solvit. Hippocrates.

Vide Sauvage, Nos. meth. cephalæa melancholica.

Hoffman de balneorum usu in affectibus internis.

Si siccitas & sitis simul adsint, balnea potius ex usu sunt, quam agitatio ulla sudorificis aut calidioribus medicamentis tentata. Fordyce de hemicrania.

Vide a remarkable case in the second volume of Dr. Percival's essays.

† Sauvage, V. contractura dolorifica.

‡ Vide Tronchin de colica picton.

in general, than those which more especially affect a particular part. Infanity, whether of the furious or melancholic* kind, has been greatly relieved by the warm bath; especially those cases which are attended with a retention of the natural evacuations.

In infan-
ty.

Epileptic disorders † likewise, especially those which arise from, or are attended with, a suppression of some of the natural discharges, or such as the patient has been long accustomed to, are greatly relieved by warm bathing.

In the
epilepsy.

* Prosper Alpinus de medicina Egyptiorum, p. 115.

Dulcium balneorum usus, si quid aliud, melencholicis opitulatur. Alex. Trallianus, l. i. p. 107.

Exemplo est infania, sive cum tristitia, sive cum furore juncta, ad quam tollendam balnea quam maxime conferunt. Familiare id morbi genus esse hypochondriorum vitio laborantibus, ubi nervosæ imi ventris partes spasmo contractæ sunt, nec excrementa dimittunt, summaque etiam cutis frigore, teste spastica contractione, affecta est. Non alia sane balnea hic salutarem præstant efficaciam nisi quod nervosas partes contractas emolliant, atque relaxent, cutimque stric- tam & frigidam calido tepore aperiant. *Hoffman, de balneorum aquæ dulcis usu in affectibus internis.*

Warm baths are advised by Boerhaave in this disorder. Aphorism. 1114.

† Ita in epilepsia quæ in fæminis ex mensibus suppressis oritur, novimus balnea, aliis interpositis remediis, cum fructu usurpata. *Hoffman, de balneor. aq. dulc. usu in aff. internis.*

It

It St. Vi-
tus dance.

It is likewise a probable remedy in a disorder nearly allied to the foregoing, called St. Vitus * Dance, when proceeding from the same cause as above mentioned.

In hysteric
disorders.

In hysteric † diseases, attended either with obstruction of the menstrual discharge, or fluor albus of an acrimonious kind, the warm bath is of great service.

In hypo-
chondriacal com-
plaints.

Hypochondriac disorders are also greatly relieved by the warm bath, as has been before observed in speaking of it as a stimulant; but its antispasmodic qualities are doubtless highly useful in this disorder, as it is by universal consent determined to be of the spasmodic ‡ kind.

* Vide Sauvage, de Scelotyrbæ chorea Viti.

† Vide Sauvage, hysteria chlorotica. Hysteria a Leucorrhœa.

Aretæus advises the warm bath in these cases. De hysterica suffocatione.

Neque vero tantum hypochondriaci, sed & fœminæ hystericis pathematibus obnoxie, a balneorum usu non neglectis internis remediis, desideratissimum solamen atque allevamentum accipiunt. Hoffman, de balneorum usu in affectibus internis.

‡ Hoffman ascribes the good effects of the warm bath in this disorder to its antispasmodic qualities.

It is frequently too of great service in the nervous atrophy,* attended with fever, which is in all probability owing to this quality.

In the
nervous
atrophy.

I am likewise much inclined to attribute its use in *fevers* to the same cause.

Among the Antients, it was in great esteem on this account; but among the Moderns, it has nearly fallen into total disuse in this disorder. I shall not deny, that the Ancients probably used the warm bath too indiscriminately in fevers, nor that its use was more allowable in a hot climate than in our own; but on the other hand I think we may safely affirm, that its use has been too much neglected among us in this as well as in many other disorders.

It was in great esteem among the Ancients in fevers in general, but especially in

* Utile est interdum balneum. Celsus de Atrophia.

Cælius Aurelianus advises repeatedly the use of the warm bath in this complaint.

This complaint seems owing generally to obstruction of the lacteal system, which may proceed from spasmodic constriction, and be relieved by the warm bath. The effect of the warm bath in increasing the absorption of the nutritive parts of our food, has been observed by Prosper Alpinus, who relates, that it is commonly used in Egypt by the women; to render them more corpulent.

intermittents.

Its use in
fevers.

In inter-
mittents.

intermittents. It was used by them either in the interval * of the fever, or immediately on its access, † but never during its height. By the accounts we have from them, it must have been an efficacious remedy in obviating the cold fit, (and of consequence the disease itself) probably by taking off the spasmodic rigor, which in a great measure constitutes it. It seems also to have been employed at the end of the hot fit, with a view to give a more complete termination to the paroxysm, which may be easily conceived from its relaxing and antispasmodic qualities. Since the discovery of the bark, the warm bath has fallen into disuse in this disorder; but instances of its efficacy are not wanting in modern practice, even in cases which had

* Quisquis febre liberatus est, simul atque ex uno die non accessit, eo qui proximus est post tempus accessionis tuto lavari potest. At si circuitum habere ea febris solita est, sic ut tertio quartove die revertatur, quandocunque non accessit, balneum tutum est.

Et in his quidem febribus quæ certum circuitum habent, duo balnei tempora sunt alterum ante horrorem, alterum febre finita. Celsus, cap. xvii. lib. 2.

† In prima febris accessione inclinante, ducendi in balneum omnes sunt, tum pinguiter simul & molliter fricandi. Galen. Meth. Med.

Iterum

resisted the most celebrated * febrifuge remedies.

It appears to have been most successful when used according the antient method, just before the time of access of the paroxysm.

The warm bath was likewise of great use among the Antients in continued fevers, and their intention in using it seems similar here to the practice in intermittents. If circumstances allowed, they bathed their patients on its first access; but if this opportunity was lost, they cautiously avoided

In continued fevers.

Iterum lavacra calida ex aquâ potabili in tertianis, quia bilem educendo ejiciunt, neque nocent si bis in die usurpentur, etsi etiam coctionis signa non appareant. Galen, de Therapcia.

Tertianâ laborantibus balneum ut maximum præsidium adhibendum maxime, si quis calido & sicco temperamento præditus est, licet non prius cocta fuerit materia peccans. Alex. Trallianus, l. xii. p. 785.

* Felix Platerus, lib. ii. obs. p. 281.

When or whence it took its rise I know not; but yearly almost in the season I see intermittents cured by a method of bathing on the approach of the fits, and drinking daily a light steel water, and this when the disease has been of long standing, frequently relapsing, or is become anomalous, and the common febrifuges avail little. Few go without a cure, though somewhat tedious.—Appendix to Dr. Gilchrist on the use of sea voyages in medicine.

it

it while the inflammatory disposition * was predominant; but, when that began to abate, they again used it with advantage; and this mode of using it seems highly justifiable both in theory and practice. At the first access of the cold fit, and before the fever was formed, the warm bath was likely to be of great service by its antispasmodic quality, in removing that spasmodic constriction which attends the access of a fever, and in the opinion of many eminent men lays the foundation of the disorder. If this opportunity was lost, and the fever formed by the succeeding of the hot fit to the cold one, it must be obvious that a hot bath would be injurious on account of its stimulus, and moreover highly dangerous on account of its rarefying effects on the fluids, whose bulk and impetus were before preternaturally increased. When, however, the inflammatory disposition

* Hippocrates de morbis mulierum, cap. lviii.

Celsus, cap. xviii. lib. 2.

In putridis febribus apud Ægyptios usus est frequentissimus eo enim in omnibus tum continuis, exceptis pestilentibus, tum intermittentibus familiarissime utuntur non tamen in principiis sed quando declinare caperint.

Prosper Alpinus de Medicina Ægyptiorum.

has abated, and the remaining fever seems to be kept up (as frequently appears to be the case) by an increased irritability of the system, from weakness caused by the disorder itself, and the necessary evacuations; when stimulants and antispasmodics are indicated to keep up the *vis vitæ*, the warm bath promises to be an excellent remedy; being moderately stimulant and cordial without inflaming; antispasmodic without nauseating the stomach; gently filling the vessels without loading the organs of digestion; moderately promoting perspiration, which seems to be the most natural crisis of a fever; not interfering with any internal medicine, and entirely at our command as to the continuation of its effects.

The warm bath is likewise of the utmost service in that kind of low delirium which attends the advanced state of a fever, and seems more owing to an affection of the brain and nerves than to inflammation, and which indeed seems often to proceed from inanition, as it frequently comes on where large evacuations have been used.

In febrile
delirium.

In these cases, the warm bath has generally
E rally

rally the most happy effects,* inducing a pleasant sensation of the nervous system, taking off the spasmodic stricture on the skin, which generally attends this symptom, and thereby procuring a passage for the cutaneous evacuation, which generally gives great relief; procuring sleep without the inflammatory effect of opiates; and frequently promoting the discharge of thick urine, by taking off the spasm which affects those organs, (so remarkably when the head is disordered) the removal of which is so necessary to the cure.

In the
small-pox. The success of warm bathing through
the several stages of the small-pox,† seems
to

* Vide Dr. Gilchrist, on the use of warm bathing in fevers. Appendix to the use of sea voyages in medicine.— All the cures he relates, wherein the warm bath was successful, seem to have been of this kind, one only excepted, and even as to that there is some doubt.

Vide a case of this kind in Dr. Percival's works, vol. II. p. 207. and another, p. 210. *ibid.*

My ingenious and learned friend, Dr. Haygarth, has informed me, that he had a case of this kind wherein the warm bath was of the greatest service. The patient was bathed several times, and every time, except one, her reason returned as soon as she was immersed; and after the last time of bathing, she gradually recovered without suffering one symptom of returning delirium.

† Magnas laudes meretur talis methodus per quam morbi molestiam & periculum minui constat. Van Swieten. *Com. Aph.* 1394.

Quo

to depend on the same principle, viz. on its taking off the stricture on the surface of the body, and by that means giving a free exit to those cutaneous evacuations, which carry off part of the variolous matter without coming to suppuration. At the same time, it resolves many of the pustules, and thereby prevents the concomitant fever, which the generation of pus always occasions.

The warm bath also has been found of great service in fevers, attended with local inflammation, as in the pleurisy, peripneumony, * and paraphrenitis.

Inpleurisy, peripneumony, and paraphrenitis.

Quo magis ergo perspirabilis est cutis, eo melius, cæteris paribus, & contra. Van Swieten. Com. 1394.

Hoc imprimis observavi, dum, omnem curam impendens unicæ ægræ nocte dieque spongiis aqua calida madidis foveri curavi cutim, sic enim evidenter patuit plures resolutas fuisse, paucas admodum suppuratas. Van Swieten. Com. 1394.

For a more full account of warm bathing in the small-pox, vide Van Swieten. Com. 1394, and Fischerus de remedio rustic. variol. per balneum curandi.

The good effect of the pediluvium, so well known in this disorder, and advised by Sydenham, is a great presumption in favour of this remedy.

* Conveniunt autem (balnea) in totum magis peripneumonitis quam febribus ardentibus. Nam dolorem lateris & pectoris & dorsi balneum lenit, & sputum maturum facit, & educit, & facilem spirationem reddit. Hippocrates de victu acutor. cap. xxxii.

Its use in these is extremely antient, and modern practice has confirmed the propriety of it. The same caution is necessary here as in simple fevers, not to use it 'till the feverish heat and inflammation be somewhat abated. When this is effected, it proves an excellent remedy for allaying the pain, taking off the spasmodic stricture on the lungs, and thereby easing the breath, and promoting expectoration more efficaciously and safely than the gum resins, such as gum ammoniacum, which is frequently used for that purpose.

Tunc post tres vel quatuor dies, solutis febribus, adhibendum est lavacrum. Cælius Aurelianus, lib. II. cap. xviii. de pleuritide.

In lateris dolore si morbus se remittat, æger balneo utatur. Ægineta.

Concoctis jam affectionibus balneum citra periculum adhibetur, quum etiam ad expurgationem sputorum quæ pleuriticorum & peripneumonicorum thorace & pulmone continentur maxime conferat. In iis ergo qui sic affecti sunt, balneum iterari nihil prohibuerit. Oribasius, lib. x. cap. 7.

There is no case in which the warm bath seems to be more indicated, and to promise more relief, than the higher instances of pleurisy and peripneumony, to which may be added, a paraphrenitis. It must far exceed those partial bathings, so much recommended in these cases; for applied to the whole chest, it will affect powerfully all the containing parts, cool more effectually the inflammation, and by relaxing kindly the vehement constriction, give greater freedom of respiration. Gilchrist on bathing in fevers.

WARM BATH *when indicated.*

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The warm bath is likewise successfully employed in inflammations of the kidneys, either proceeding from calculi, or original affections of the part. It seems particularly suited to this complaint by the almost universal recommendation of it by both antient and modern practitioners.* The same caution as to its use is necessary here as in the foregoing, though perhaps not so immediately.

In the
nephritis
vera.

From its effect on the nervous system, it seems a probable remedy in the * phrenitis, after due evacuation.

In the
phrenitis.

* Hippocrates reckons four diseases of the kidneys, all of them of the inflammatory kind, though differing in symptoms and degree. He repeatedly recommends the warm bath in all of them : De internis affectionibus, cap. 15, 16, 17, 18.—Quod si non febrant præstat eos in balneum de ducere. Aretæus, Curatio renum acuti affectus.—Sæpe desidere in aqua calida. Celsus, de renum morbis.

Baths are advised by Boerhaave, aph. 997. and by Van Swieten in his Commentary. Sauvage advises the warm bath to be repeatedly used in this disorder after bleeding and purgatives.

Peculiari etiam modo solatur eos qui a renali calculo sustinent cruciatus. Hoffman, de baln. usu.

Ubi morbus inclinaverit ad balneum deducuntur. Præterea cum inflammatio infestat a balneis abstinendum esse censemus. Ægineta, de renum inflammatione.

* Aretæus advises a bath, if the disorder continues long and attended with a flow fever after evacuations. De curatione phreniticorum.

In the
enteritis.

It has likewise, with the same precaution, been used with success in inflammation * of the stomach and bowels.

In the
hepatitis.

Inflammations of the liver † also are relieved by it, and the caution of premising evacuations, though proper to be attended to, is not so immediately necessary; as the liver is less sensible both of inflammation and suppuration than most of the other abdominal viscera.

In inflammation of
the bladder and
uterus.

The warm bath also, cautiously used, proves an excellent remedy in inflammations ‡ of the bladder. It has likewise
been

Sauvage advises the body to be washed with warm water in inflammations of the brain after bleeding. Vide Cephalitis.

Inter externa, omnium optima, balnea aquæ dulcis temperatæ. Hoffman, de febre phrenitica.

Vide a case which seems to be of this kind from an inflammatory angina, in which the warm bath was of great service. Dr. Percival's works, vol. II. p. 207.

* Vide Van Swieten, com. vii. aph. 954.

† Celsus advises the warm bath in inflammation of the liver. De hepaticis.

‡ Balnea aquæ dulcis optimum doloris procurant lenimentum. Hoffman, de inflammatione vesicæ. Hippocrates, aphor. lv. aph. xii.

Semicupia are advised by Sauvage. Vide cystitis.

been used with great advantage in uterine * inflammations.

I shall now proceed to speak of the warm bath as indicated on account of its diaphoretic qualities. As a diaphoretic.

Though I have referred the effect of the warm bath in fevers principally to its antispasmodic quality, (which is indeed in a considerable degree the foundation of its diaphoretic one) yet its peculiar effect in promoting the last-mentioned evacuation (which is of so great consequence in inflammatory disorders) is not to be neglected; as there is no doubt of its being particularly serviceable in the above-mentioned diseases. But there are some inflammatory cases, wherein its diaphoretic quality seems to be principally of service.

No complaint is more aggravated by obstruction of the perspiratory discharge than the

† Aretæus advises the warm bath here. De curatione suffocationis hystericæ.

Hippocrates advises a warm bath in this complaint. De morbis mulierum.

Hoffman recommends warm bathing here. De inflammatione & febre uterina.

In the
rheuma-
tism.

the rheumatism,* and none more relieved by the warm bath. This remedy is of the utmost service in this disorder, both when idiopathic, or primary and original in the constitution, or symptomatic as in consequence of some other disorder or occasional cause. It seems to succeed best when used after the inflammatory disposition has either abated of itself, or been diminished by other evacuations.

In the
gout.

I look upon the diaphoretic quality of the warm bath to be a principal foundation of its use in gouty cases. I do not mean to deny the efficacy of the stimulus of warm bathing in resolving gouty obstructions, but shall reserve that 'till I speak of pumping,

* Boerhaave advises the warm bath in the rheumatism, aphorism 1493. As does Sauvage, vide rheumatismus.

Balneorum quoque, tam naturalium quam artificialium, caute administratorum, usus est insignissimus. At vero neutiquam in principio aut in statu morbi, sed in declinatione potius ad reliquias morbi ex intimis sedis suæ penetralibus moderato sudore eliciendas. Hoffman, de doloribus & spasmis partium externarum rheumaticis atque arthriticis.

Dr. Mead has laid it down in his *Monita & Precepta Medica*, that warm water, fomentations, and such like, increase rheumatic pains by their relaxant quality; but it seems more probable, that this effect was owing to their stimulus and rarefaction of the blood and fluids, as being used before the inflammation was sufficiently abated.

ing, which is generally used for that purpose, and wherein the stimulus of the water is more particularly exerted.

It seems to be the established practice to use this remedy in the decline of the fit, or in the interval; but not during the inflammatory state. When judiciously managed in this way, it often proves an admirable remedy, carrying off the remains of the gout by gentle perspiration,* and by that giving a more complete termination to the paroxysm than could be procured by any other means.

The warm bath likewise, on account of its diaphoretic quality, is an excellent remedy

In the
scurvy.

† Porro ad methodum tam præservatoriam quam curatoriam, nihil securius nihil accommodatius regimine diaphoretico, salutari consilio procurato, inveniri potest. Nam si verum, uti est verissimum, quod sanguis serosus impurior, qualis maxime ex transpiratione prohibita redditur, causa antecedens & materialis paroxysmorum podagricorum sit, ipsa certe sanior dicitur ratio quæ experientia confirmatur, atrocem hunc morbum quam optime & tutissime, facta liberaliori transpiratione, vel ea quæ secundum naturam sit, restituta, esse remedium omnibus aliis superius. Hoffmann, de dolore podagrico & arthritico vero.

Sudorifera ex arte instituta plus proficere. Boerhaave, aphorism. 1272.

Suadeo certe uti semel in hebdomada hypocaustum jejunus adeat. Carolus Piso, sect. v. cap. 2.

Tum, cum firma declinatio fuerit constituta adhibenda lavacra. Cælius Aurelianus, lib. v. cap. 2.

medy * in scorbutic complaints. It appears by the accounts given us by the best writers on this disorder, that it rages most violently in circumstances unfavourable to perspiration, as in cold † weather and cold climates; and that it scarce ever appears in warm climates, except in the rainy seasons; but that a combination of cold and moisture dispose particularly to it. Nor is this difficult to explain: for as perspiration is the principal evacuation intended by nature for carrying off such portions of our fluids as become acrimonious and prejudicial to health, on account of their tendency to putrefaction, (to which all animal substances

* Whatever promotes perspiration is useful. Lind on the scurvy, p. 187.

† Its virulence will always be greatly augmented by the addition of cold. Thus we find it a much more frequent disease in winter than in summer, and in colder than in warmer climates. It is generally owing in southern latitudes to the continual rains, which fall there at certain seasons. But a combination of cold and moisture is the most frequent and general source of this disease. Lind on the scurvy, p. 72, 73.

Certe genesis scorbutici mali, quod non nisi maximus impuritatis gradus est, non aliunde quam ab hac origine repetenda. Quo magis enim in humoribus vitalibus crescit impuritas ex incongruis et minus temperatis assumtis, eo plus vigere debet excretionem, inque primis perspirationis negotium, eoque sufflaminato, eo gravior metuenda est noxa.—Hoffman, de damnis ex cohibita cuticulari excretione.

stances are particularly subject) it is plain what must be the consequences when this evacuation is diminished, and the putrefactive disposition increased.

The warm bath here, by increasing this evacuation in a mild and easy manner, contributes greatly to prevent the putrefactive taint from spreading and contaminating the animal fluids, by carrying it off as it is generated. Its proper use,* according to some writers, is either in the beginning or decline of the disorder; but by no means when the putrefactive disposition is so strong as to form external ulcers. †

This caution seems well founded, partly on account of the old observation, that the warm bath was injurious to an open sore, and moreover, because, in that state of the disease, the solids are so easily ruptured, that an hæmorrhage ‡ might be apprehended from the bursting of a blood vessel,

* Warm baths are recommended by Dr. Lind, p. 200.—and by Boerhaave and Van Swieten, aph. 1161.

† Hoffman, de scorbuto ejusque vera indole.

‡ Sauvage advises the warm bath, with this caution: Modo nullus hæmorrhagiæ sit metus. Art. Scorbutus.

vessel, caused by the stimulus and rarefying quality of the warm bath.

In the lues
venerea.

To this quality is owing the well-known efficacy of the warm bath in the lues venerea.*

In the
cholera
morbus.

The warm bath is likewise of great use in the cholera morbus, in changing the determination from the intestines to the skin; a circumstance of the greatest consequence in this disorder.

In the
colic.

By the same power it greatly relieves those habitual colics and laxities of the intestines,† which are frequent among those

* Sauvage advises the warm bath once or twice a day as a preparation for the mercurial unction. Vide Art. Syphilis.

Nunquam facile secundum nostram sententiam atque experientiam mercurialia modo salivationis modo evacuationis per sudorem sine, five in lue venerea, five in aliis rebellibus morbis propinanda sunt, nisi balnei usus intercedat. Hoffman, de balneorum usu.

Vide Boerhaave, aph. 1458. and Van Swieten's commentary on it.

† It has long been a received notion in physic, that the warm bath was prejudicial in laxity of the intestines, derived, I imagine, from Hippocrates,^c who advises not to bathe in such cases. But this caution, I am certain, both from theory

^c Minime vero tempestivum est, eos lavare quibus alvus in morbis liquidior jacto est. Hippocrat. de victu acutorum.

who change from a hot to a cold climate; and which obviously arise from a suppression or diminution of the perspiratory discharge.*

theory and experience, is too universally attended to.—In the putrid dysentery, and all purgings attended with symptoms of putrefaction,^d this caution is very just and proper; but where no symptoms of this kind occur, the warm bath is an excellent remedy in restoring perspiration, which is always obstructed in these disorders, at least in their beginning, and at the same time abating the convulsive motions of the stomach and intestines. This consent of the stomach and intestines with the surface of the body, was well known to the Antients. *Cutis ficitas alvi laxitas*, is an aphorism of Hippocrates, and the restoring perspiration^e has always been esteemed a principal point by all practitioners. Sydenham found in some fevers that the vomiting could not be checked but by producing a sweat. Nothing seems more safe or effectual in such cases than the warm bath, which is indeed recommended by some of the most eminent among the Antients. Celsus, Galen^f, and Aretæus, all advise the use of the warm bath in the cholera morbus; and Cælius Aurelianus^g advises it to be repeatedly used in the same disorder, as long as the vomiting continues, in which case, as well as in purgings, it was forbidden by Hippocrates.^h

* The perspirable matter checked suddenly and thrown back upon the constitution, is in all cases very apt to affect the

^d Vide Sir John Pringle's works, p. 326.

^e Sir John Pringle observed, that those were most liable to be seized with the dysentery, who, after a hot day, were exposed to the damps and colds of the night. p. 253.

^f Tunc si plurimus (inquit) vomitus fuerit, lavandos ægrotos calida & post lavacrum, somno dimittendos. Galen.

^g De cholera.

^h De visu acutorum.

In the
dysentery.

On this account the warm bath must be of great service in the dysentery, provided it be not accompanied with great inflammation, or tendency to putrefaction; and must far exceed, both as an antispasmodic and diaphoretic, the fomentations and partial baths generally recommended.

In the
diabetes.

The diabetes * likewise has been greatly relieved by the same quality of the warm bath.

In the
mania.

On the same account, as well as of its antispasmodic quality, it is of great service in † maniacal disorders; where this discharge

the bowels; and vice versa, I have more than once known a diarrhæa, which has resisted other remedies, yield entirely to the use of the warm bath. Dr. Baker. Med. Transact. vol. II.

* Van Swieten, with great propriety, makes it one of the principal indications of cure—*Ut tota cutis superficies laxa & maxime perspirabilis fervetur*—And seems to approve of Celsus's¹ method of cure, who advises the warm bath for that purpose. Vol. II. p. 275.

† Hoffman makes the opening of the cutaneous pores one of the principal uses of the warm bath in maniacal disorders. De balneorum usu.

Aretæus advises a warm bath on the same account. *Raræ enim mollesque carnes ad ægri tudinis remissionem maxime faciunt, verum istæ in melancholicis aridæ sunt, & densæ. Curat. melancholicæ.*

¹ De urinæ nimia profusione.

charge is very small, and its restoration of the greatest consequence.

From the importance of keeping this discharge free in cutaneous disorders, I imagine that this effect of the warm bath must be of great use in the cure of the leprosy,* and other disorders of the skin.

In the lepra.

I shall next speak of the use of the warm bath with regard to its diuretic qualities.

As diuretic.

I look upon this to be no small cause of its efficacy in hepatic obstructions.

In hepatic obstructions.

The good effect of gentle diuretics in these disorders is well known; and the increase of this discharge is generally the first and best symptom of amendment that can occur. The warm bath, if made use of at the beginning of the complaint, while the obstruction is recent, and before any inflammation is come on, is likely to serve this purpose admirably well; uniting in itself several qualities, all conducive to the cure

* *Ingrediatur balneum per decem dies iterandum. Sauvage, art. Lepra.*

Balnea, vero assidue ad madefaciendum corpus & ad humores noxios perpirandos proficiunt. Aretæus, curatio elephantiasis.

WARM BATH *when indicated.*

cure of these disorders: being mildly stimulant to the nervous and vascular system without heating, and antispasmodic without oppressing the stomach; two circumstances of great consequence in the removal of obstructions. Moreover (as absorbed into the body) it washes out the glandular system, and at the same time promotes the urinary discharge; * which experience has shewn to be the most favourable for removing obstructions of that kind.

In the
febrile.

From the good effects of diuretic medicines in scorbutic disorders, we may infer, that this † quality of the warm bath is one cause of its efficacy in this complaint likewise.

In the
scrophula.

It seems probable, that to the like quality is owing, in some degree, its good effect in the scrophula.

* Diuretics are advised by Celsus in liver complaints.—
De hepatis morbis.

The good effect of gentle diuretics is taken notice of by Van Swieten. *Non enim hic requiruntur acris diuretica sed leniora tantum.* Commentary on aph. 925.

† *Urinæ scorbuticorum contentis saturatæ sunt & acres, magnamque sedimenti copiam ponere solent, unde videtur natura ipsa hanc viam indicare, ut sanguis ab acrimoniâ in hæc ente depuretur.* Van Swieten. *com. §. 1164.*

The

WARM BATH *when indicated.*

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The relief of the * leprosy by warm bathing is in all probability owing, in some measure, to the diuretic as well as to its detergent and diaphoretic qualities.

In the
lepra.

The same property, no doubt, adds greatly to the efficacy of the warm bath in maniacal disorders, wherein this secretion is in general greatly diminished.

In the
mania.

But its principal efficacy this way is in calculous cases. One great cause of the generation of calculi, seems to be, the too long stay of the urine in the bladder before it is evacuated, by which it is in a manner decomposed, and lets fall a crustaceous sediment. This conjecture seems confirmed by the observation, that those people are more particularly subject to this disorder, who are obliged to retain their urine a long time; and it is not improbable, that one reason why malt liquor is more apt to breed calculous concretions than wine or spirituous liquors, may be, that it is less diuretic.

In the
Calculus.

F

The

* For the importance of diuretics in this disorder, vide Dr. Mead's *Medica Sacra*.

The warm bath furnishes an excellent remedy in this case ; being mildly diuretic, and at the same time antispasmodic, whereas the things commonly used with this intention are often very dangerous or troublesome, on account of their stimulus, which frequently excites pain or strangury. Their effects too are much less under command than those of the warm bath, which is indeed likewise in general the best remedy for the bad consequences the former are so apt to produce.

As expectorant.

The warm bath may likewise in some circumstances be of service by promoting expectoration in peripneumonic complaints, wherein this discharge is the most natural and best termination. Its expectorant quality is here of considerable service ; especially as it is not accompanied with the stimulating properties of most of the substances generally employed with that intention.

In the peripneumony.

In gouty coughs, & asthma.

It is also of great service on the above account in gouty coughs, and asthma, when proceeding from a gouty cause ; which are generally attended with a defect of this secretion, which warm bathing often promotes

WARM BATH *when indicated.*

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motes in such a manner as to carry off the fit easily and safely by that means.

Its use likewise in the spasmodic asthma, is probably in some degree owing to the same cause. In the spasmodic asthma.

I do not know any circumstances to which the warm bath is particularly adapted on account of its increasing the salivary discharge. As sialagogue.

As to the indication of the warm bath as an emmenagogue, I have spoken of it before when I treated of its stimulant and antispasmodic qualities, to which I have referred this effect. As emmenagogue.

I now come to the second head of this chapter, wherein (according to the plan laid down at the beginning) I propose to treat

Of MEDICATED BATHS.

This subject is too copious to be fully discussed here; especially, as I have before said, I mean this part of the work only as introductory to, and explanatory of what I shall afterwards say concerning the external application of the Bath waters. Of medicated baths.

I shall therefore only attempt it in a general manner :

Medicated baths then, according to the definition formerly given of them, consist of water impregnated with substances which impart their own proper qualities to it, and thereby render its effects on the body different from those produced by common water.

Medicated baths, according to the present subject, may be considered in this place as of two kinds :

Artificial
medicated
baths.

First, Those prepared by art ; and,

Natural
medicated
baths.

Secondly, Those exhibited to us by nature as baths of native mineral waters.

Of what
they may
consist.

As to the composition of these, whether natural or artificial, I think it may be safely laid down, that every substance that can be supposed to vary their effects, must be actually suspended by the water in a state of solution * or mixture.†

* Nothing in a state of diffusion can act on the surface of the body otherwise than mechanically, or be supposed capable of entering the pores.

† I know but one instance where the latter of these is likely to occur, which is in the union of oily bodies with
water

Artificial baths admit of a great latitude in this respect, as all the substances of the saline kind, many of the inflammable, and some of the metallic and earthy, and even aerial substances, are capable of being applied in this manner.

As to the first of these, solubility in water is their distinguishing characteristic. Every saline body therefore is capable of entering into their composition.

Saline bodies.

As to inflammable bodies, sulphur is judged not to be of itself soluble in water, and therefore in this state cannot enter into the composition of a warm bath. But this does not affect it when rendered soluble by other substances, as alkaline salts or quick lime, in which state it may form an efficacious ingredient.

Inflammable bodies.

Sulphur.

Oily substances * likewise, both expressed

Oils and resins.

F 3

fed

water by means of an alkaline salt, which is probably a degree of chemical mixture, as appears from Sir Isaac Newton's experiment on the soap bubble.

* Many essential oils and resins, which are not by themselves miscible with water, when separated from the vegetable are easily extracted from the vegetable itself, and retained, for some time at least, in a state of solution, or intimate mixture, especially if heat be applied.

This is likewise the case with expressed oils, except that heat rather prevents than promotes their mixture with water.

Of MEDICATED BATHS.

fed and essential, though immiscible with water by themselves, are capable of an intimate union with it by various means; and then may properly form an ingredient of medicated baths.

The like may be said of resins,* and gum resins, which last are, in a degree, by themselves miscible with water.

Gums and
mucilages.

The gummy and mucilaginous parts of vegetables are also capable of entering into their composition as being easily soluble in water.

Most of the efficacious qualities of vegetables may be referred to the above-mentioned parts of their composition; but there are some others which we cannot so easily determine in what part of the vegetable they are lodged, which are nevertheless easily extracted by water, and as such may enter into the composition of a warm bath.

Astringency of
vegetables.

Thus the astringency of vegetables is easily extracted by water, and is an useful quality.

* The solubility of these in water is owing, in a great degree, to the gummy and farinaceous substances with which they are frequently blended in the native vegetable.

quality in external applications of this kind, though we know not exactly in what part of the vegetable it is lodged.

The bitterness * likewise of some plants may be extracted in the same manner, though we are ignorant to what part of the vegetable to ascribe it.

Bitterness
of vegeta-
bles.

The antiseptic qualities of vegetables also form an useful ingredient in our baths. These may be considered in two lights, either as general, (since all vegetable infusions in water are possessed of an antiseptic† power) or peculiar as when the particular quality of the vegetable is extracted. The latter of these is generally aimed at in external applications of this kind, though I doubt not that much is owing to the antiseptic quality common to all vegetables.

Antiseptic
qualities
of vegeta-
bles.

Spirituous substances likewise, or fermented liquors, may (as easily miscible with

Spiritu-
ous sub-
stances.

* This may seem an extraordinary quality to expect in a warm bath; but we should consider, that the efficacy of the Peruvian bark (which is proved to be very great in this way, vide Alexander's Essays, vol. I.) is probably owing to a combination of bitterness with astringency; both of which are necessary to be extracted to give it its full force.

† See Dr. Alexander's Experimental Essays, vol. II.

with water) enter into the composition of medicated baths.

Metallic
substan-
ces.

Metallic substances also, tho' in themselves insoluble in water, may, by being reduced into a saline state, become miscible with it. Iron* is the most commonly used for this purpose; though copper, antimony, and cobalt are mentioned by some of the writers on this subject, as sometimes entering into their composition.

Calcareous
earth.

As to earthy substances, the calcareous earth is the only one that can enter into the composition of a bath, as being the only one soluble in water. I never heard of its being made trial of, though it is not improbable it might be applicable to some useful purposes.

Aerial
substan-
ces.

Some aerial substances likewise are capable of intimate union with water, and on that

* Communissima horum & utilissima sunt, quæ ex scoriis martialibus terreo—salina & sulphurea martis substantia fœtis, concinnantur.

Præter hæc, in locis ubi metallifodinæ vigent, & minerarum cuprearum antimonialium & cobalti uber proventus, recepti usus sunt balnea quæ ex horum scoriis præparantur.

Hoffman observationes de thermis ad imitationem naturalium per artificium præparandis.

that account may be ingredients in baths. But fixible air is the only one that can, properly speaking, be employed in an artificial bath.

Fixible
air.

As to natural baths, their impregnation is much more limited, since it is plain that nothing can enter into their composition except native * fossile substances, and such of those only as water is capable of being united with, by such means as we can suppose to exist in nature.

Natural
medicated
baths.

For a list of these substances I shall refer to the first volume of this work.†

I shall now make a few observations on the comparative efficacy of baths of simple water, and medicated baths, with regard to fulfilling the indications for which they are required.

Compari-
son of me-
dicated
baths with
simple wa-
ter.

I shall take these in the order in which they are mentioned above.

First, then, as detergent to the surface of the body.

As deter-
gent.

In

* Vide vol. I. p. 30.

† Vide vol. I. p. 194.

In this respect medicated baths have certainly the advantage of simple water ; for by alkaline salts and saponaceous substances they may be rendered much more efficacious, in washing off the foulness caused by perspiration, which is always combined with an oily matter not of itself miscible with water : and though this is in some degree rendered miscible with the water by the substances with which it is united in the body, yet it is but imperfectly ; and therefore not near so easily washed off by simple water as when that is united with alkaline salts or saponaceous bodies. Yet these substances should be tried with great caution ; for, if used in too great quantity, they are apt to wash out the oily matter which is lodged in the cutaneous pores for the purpose of keeping the cuticle soft and relaxed, and by this means cause it to become hard and rigid ; by which means perspiration would be obstructed, and our sense of feeling impaired.

On this account the Antients, with whom warm bathing was a frequent exercise, and who staid long in the bath, and used much friction likewise, by which means this oily matter must be rubbed out from

from the pores, in order to supply the want of it, introduced the use of oils, and other applications of the like kind, to the skin after bathing, to keep it lax and supple.

As to the use of the warm bath on account of the absorption of the fluid into the system, and thereby diluting the lymphatic humours, dissolving lentor and acrimony, and washing out the glandular cavities, (indications frequently occurring in glandular obstructions, the scrophula, and the lues venerea) I think that a warm bath of pure water would be preferable to any medicated bath, as it is likely to be absorbed into the system in greater quantity, as being less stimulant; and thereby also less liable to irritate the nerves; a circumstance of great consequence in glandular obstructions, where inflammation and schirrhus are so apt to follow irritations. Moreover, as the fluid is not loaded with any substance dissolved in it, its power as a menstruum would be greater in dissolving the viscid and acrimonious parts of the animal fluids.

As absorbed into the system, and there as diluent and solvent of lentor and acrimony.

As stimulants, medicated baths are much more efficacious than simple water, both in

As stimulant.

in their effects on the surface, and as absorbed into the system, since they not only possess all the mechanical powers of common water, but also the specific qualities of the substance with which they are impregnated. Infusions of aromatic * plants and woods, † those especially containing a large proportion of essential oil, are generally used for this purpose.

If a more powerful stimulus, to the surface especially, be required, a strong solution of any neutral salt (common salt particularly, as being the cheapest and most easily procurable ‡) may be used. Nor do I see any reason why an infusion of cantharides, which impart their efficacy easily to water, may not be made trial
of

* Hoffman advises baths of infusions of rosemary, wild thyme, and origanum, in languor and weakness of the external parts. *De præstantia remediorum domesticorum.*

Baths of infusions of aromatic herbs are advised by Van Swieten in cachectic disorders, to correct the relaxing effects of warm water only. *Aphor. 661.*

† A bath of this kind is recommended by Baglivi—*de Fibra Motrici*, p. 415.—and by Fuller *Pharmacop. Extemporanea*, p. 22, in the palsy.

‡ A saturated solution of common salt in water is frequently applied with success as an epithem in rheumatic complaints, and if long continued on the part will raise a blister like cantharides.

of, especially in topical baths, in cases wherein a strong stimulus is required,

I have likewise observed some mineral waters have this effect in a greater degree than common water, owing in all probability to their aerial impregnation; which, (as being intimately combined with the water by solution) we may easily suppose to be absorbed into the system along with the fluid, and there exert its stimulus on the nerves and blood vessels. I will not deny that this is possible to be imitated by art,* but the uncertainty of the operation, with the trouble and expence attending it, render it not very likely to be made trial of, except where we have no mineral waters of the kind within any reasonable distance.

Medicated baths have also the advantage over simple water in some respects as antispasmodics.

As antispasmodic.

In

* A great difficulty in making an artificial bath impregnated with fixible air would be, that it is almost immediately dissipated by heat, and therefore would require a constant supply, which could only be had conveniently from a current of a spring thus impregnated.

In cases where stimulant medicines can be born or used with advantage, as in many nervous affections, where the heat and circulation are either little affected or below the natural degree; or where none or but a small degree of fever or inflammation is connected with the spasm, as frequently happens in the biliary calculus, and sometimes in the passage of stony concretions from the kidneys to the bladder through the ureters, and from the bladder through the urethra, and in spasmodic constipations of the bowels not attended with inflammation; in these and such like cases, I say, medicated* baths are likely to be preferable to simple water: but in cases wherein the circulation and heat are increased much beyond the usual point, I should think simple water preferable; because all our antispasmodic impregnations (if made strong enough for us to expect any benefit from them) are attended with a considerable degree of stimulus or opiate quality, both of which would render them highly

* Vide, a receipt for a bath of this kind in Hoffman, vol. ii. p. 346.

highly * improper at a time when the inflammatory diathesis was predominant.

The substances generally used to impregnate the water for this purpose, are the aromatic and fœtid plants, when a stimulus is required to be joined to the antispasmodic quality; and those of an opiate kind when a † sedative effect only is indicated. ‡ These are boiled or infused in water 'till their virtue is extracted.

Mineral waters likewise, abounding with fixed air, have this effect in a considerable degree, but combined with a great degree of stimulus, which renders them improper in inflammatory disorders.

Whether sulphur possesses any quality of this kind in external application, § I am

* Perhaps nitre may be an exception in this case, as it diminishes the impetus of our fluids by a kind of sedative power, and at the same time possesses antiphlogistic qualities.

† Sometimes these are united with good effect.

‡ For a formula for a bath of this kind, vide Gaubius de formula medicamentorum, intended to be used in the stone. p. 299. It is taken from Boerhaave. There is likewise a pediluvium of the same kind. p. 301.

§ Hoffman attributes an antispasmodic quality to a bath made from antimonial scoræ, which he ascribes to the sulphur.—

not certain; though, from its known effects in pervading the small vessels, when outwardly applied, I should think it not unlikely to answer upon trial. Some warm sulphureous mineral waters are famous for their effects in this way; but we are not certain to what part of their impregnation it is to be ascribed, as they are at the same time impregnated with fixed air in large proportion.

As diaphoretic.

I am not clear if medicated baths are more efficacious than simple water in promoting perspiration. Stimulant substances taken inwardly, we know, have this effect; and it does not appear improbable, that their external application may in some circumstances promote it likewise. They seem most likely to succeed when the pulse and heat are below the natural degree, and when the vital powers are weak and inert. Perhaps it is owing in some degree to the stimulus of the fixible air constrained in them,

phur.—Antispasticam proinde ex his parati tribuimus balneis efficaciam, dum scilicet sulphur illud antimonii, per aquam dispersum, fibrarum emollit stricturam, quæ cum fuerit nimia, constituit spasmus, & tandem maximum efficit toni gradum: nimirum convulsiones. Hoffinan de balnearum artificialium ex scoriis metallicis usu medico.

them, that some warm mineral waters produce such a plentiful perspiratory discharge on bathing in them.

Sedative substances have likewise the same effect inwardly taken, and perhaps might succeed externally applied; but this I have not had an opportunity of confirming by experiment.

Perhaps a combination of stimulant with narcotic or sedative impregnations, would be more efficacious than either of them separately, analogous to their effect inwardly taken.

If any impregnations of water have a pretence to a peculiar or specific effect of this kind, I should think the sulphureous ones had the best claim from the well-known power of sulphur of entering the minutest vessels: and moreover, it seems to have a peculiar affinity with the perspirable matter, as the cloaths and linen of those who take it inwardly are strongly impregnated with it.

Perhaps the efficacy of sulphur in some cutaneous disorders, may be owing to this cause. Whether any artificial impregnation

tion of a bath with * antimony or mercury, would have the same effect, I am not able to determine.

As diu-
retic.

As diuretic, artificial baths are likely to be much more efficacious than simple water. The effects of the latter in this way are rather consequential or secondary than directly so; but by impregnating it with diuretic substances, the warm bath may be made to exert a specific action of this kind on the urinary organs, as well as its general quality.

The substances most likely to succeed in this way, are neutral salts; nitre † especially, dissolved in the water of the bath; infusions

* The efficacy of some of the artificial baths mentioned by Hoffman, as made with the scorix of metals, seem more owing to their sulphureous impregnation than their metallic one.

† Dr. Alexander found (vide experiment ix. vol. I. p. 31) that the external application of a solution of nitre was more diuretic than when the like substance was taken internally. This might suggest an useful hint in practice to employ diuretics *externally*, when such evacuation is required, alternately with their *internal* exhibition; which would prevent their loss of effect by habit; a circumstance so much complained of in the trial of these and other stimulant medicines, especially in dropical cases.

I have myself frequently observed a diuretic quality in a pediluvium made with a strong solution of nitre in water.

infusions of terebinthinate woods, as those of the fir and pine kind, the like of their berries, cones, and buds, as juniper berries, fir tops and buds. I have also observed the same effect from some mineral waters, which is in all probability owing to their aërial impregnation, as no other substance of a diuretic quality, equivalent to the effect produced, could be discovered in them.

How far the expectorant quality of the warm bath may be increased by addition of other substances, I have some doubt. To me it seems probable, that in spasmodic affections of the lungs, and in other cases where this discharge requires stimulant substances, such additions may be of service; but in inflammatory cases, I should think simple water greatly preferable, as possessing an antispasmodic and relaxant quality, without the stimulus of the substances necessarily employed as antispasmodics.

As expectorant.

Whether any additional substances can increase the demulcent quality of warm water externally applied, I know not; as I have not seen any experiments made on

As demulcent.

them to prove whether substances of that kind were capable of being absorbed into the body along with the water; but, a priori, as they dissolve compleatly in water, I should think it very probable; and if so, it would be an excellent method of exhibiting gummy and mucilaginous substances, when we want to abate the stimulus of the urine; since, if thus absorbed, we shall have full as much probability of their being conveyed to the urinary organs as if given by the mouth.

As salagogue.

As to the effect of the warm bath in increasing the salivary discharge, I know no additional substances that are likely to add to its efficacy, nor any particular circumstances in which this evacuation would be likely to be indicated by such means.

As emmenagogue.

As emmenagogue, I am inclined to think that additional impregnations might greatly increase this effect of simple warm water. It is well known that many substances, powerfully emmenagogue, may by these means be introduced into the course of circulation, and act upon the nervous and vascular system as well as when internally administered. The use of these substances

stances then in this way must be a valuable addition to physic. But, as the obstruction of this evacuation proceeds from very different, and frequently opposite causes, regard must be had to these in our exhibition of remedies of this nature. If the obstruction proceeds from languor, stimulant substances will be most proper; as infusions of aromatic plants, strong solutions of saline substances, or metallic salts,* iron especially, or mineral waters abounding with fixt air. If from spasmodic affection unattended with fever, infusions of aromatic or fœtid † plants, or solutions of the fœtid gums, or gum resins, or of the terebinthinate woods, (as of the fir or pine kind) or of the bitter and astringent combined, (as of the Peruvian bark) are proper. Sulphureous or chalybeate mineral waters will likewise probably be very effectual. If from feverish spasm (as often occurs in the hectic fever)

G 3 I should

* Hoffman relates a case of a woman that was relieved by a bath of this kind in a menstrual obstruction. Vide Hoffman, de balnearum artificialium ex scoriiis metallicis usu medico.

† A formula of this kind may be seen in Boerhaavii Materia Medica quæ serviunt aphorismis, §. 75. No. 6.

I should think pure water preferable to any admixture. If from general relaxation, astringents will be adviseable, amongst which infusions with a gentle heat of some of the woods or barks, oak bark particularly, solutions of metallic salts, as of iron and copper, and of the earthy salts as alum.

If the obstruction proceeds from astriction of the uterine vessels or system in general, owing to rigidity, opiates and relaxants will be proper, as infusions of poppy heads, &c. though I cannot say I believe this is often a cause of the retention of this evacuation.

So far as to the comparison of medicated baths with simple water, with respect to the qualities which they in some measure possess in common with one another.

But medicated baths have a considerable advantage in being endued with some properties to which simple water has no pretence.

As anti-septic.

Thus medicated baths may be impregnated with an antiseptic quality, not only affecting the surface, but the habit of the body, which is in both respects opposite to

to the effects of simple warm water, which has been generally supposed to dispose the body to putrid disorders.

The substances most likely to succeed in this way are, in my opinion, as follows: Nitre,* that is, if any considerable degree of fever be present, as it possesses at the same time a cooling quality.† But if the vis vitæ be depressed with great muscular relaxation, which frequently happens in putrid fevers, infusions of the aromatic plants and of the vegetable astringents, as oak bark; and, if a greater degree of it be necessary, some of the mineral astringents may be added, as alum; and if the depression be very great, a portion of some spirituous liquor may be joined with the infusion of the vegetables, when the heat is abated. But the most efficacious antiseptic of any is the Peruvian bark,

* For an account of the effects of some of these substances externally applied in this way, and the advantages likely to accrue from their use in putrid disorders, vide Dr. Alexander's Experimental Essays, vol. I. essay the 1st.

† I have not here set down sea salt, as its power as an antiseptic is very weak; but I am inclined to think that sea bathing is often of service on this account, especially in external affections.

bark,* which is a combination of bitterness with astringency, and far exceeds all the others both as inwardly taken and externally applied. An infusion of it in water with a moderate heat, seems to me the best method of using it, to which, if intended to keep some time, a little spirit might be added, or, if we desire to render it more astringent, a little alum. If camphor could be rendered soluble in water, much might be expected from its great antiseptic power. In chronical cases, as in scorbutic complaints, the native or artificial sulphureous and chalybeate impregnations may be of service, as may likewise mineral * waters impregnated with fixible air.

As astringent.

Astringency likewise is a quality which simple water does not possess in the smallest degree,

* Dr. Alexander advises the use of nitre joined with the bark as an antiseptic, which he thinks may mutually assist each other's operation.

If accompanied with much fever, I should think such addition very proper, otherwise not, on account of the effect of nitre in diminishing the force of circulation, which in such cases it is necessary to keep up.

* Some mineral waters contain the three last-mentioned ingredients, and are found very serviceable in complaints of this kind.

degree, but is capable of being imparted to it in high perfection in medicated baths; and is found in some degree in the natural as well as the artificial impregnations. Of the former of these are, first, the waters that contain copper in form of blue vitriol, of which there are some, though but few instances; secondly, chalybeats of every sort, especially those with the vitriolic acid; and, thirdly, the aluminous impregnations; which are all of this kind that possess this quality. But as the first of these is exceeding rare, and the last seldom found of sufficient strength to be depended on in external applications, the chalybeate impregnations are the only ones of the native kind from which this effect is in any degree expected.

Some other native impregnations indeed possess a tonic quality, but this is in consequence of their stimulus, as they are not directly or properly astringent.

Artificial impregnations of this sort are very numerous, but the most effectual and convenient, in my opinion, are among the vegetable, such as infusions of the astringent woods and barks, oak bark especially,

ally, or the wood itself, or the bark of the ash or horse chesnut, which are both strong astringents, though not so much as the oak, and more compounded with other qualities. Of the mineral kind, a solution of alum or of green vitriol may be conveniently used for this purpose, or a mixture of the former of these with the vegetable astringents. If green vitriol be employed, the vegetable astringents will be less proper to be joined with it, as they precipitate iron from all its solutions, in acids especially.

Some writers have recommended the use of solutions of copper * in the way of baths, to answer the purpose of astringents; but I never had any experience of their use in this way, and should think them likely to be dangerous unless cautiously managed.

Lead likewise is a powerful astringent, but when dissolved by acids, is too dangerous

† Vide Hoffman, de balnearum artificialium ex scoriis metallicis usu medico; where he relates a case of a person who was violently afflicted with the herpes exedens, which spread all over his body, and who was cured by a bath of this kind.

rous even for external use.* Whether zinc might be thus advantageously employed, I know not; but I should think it rather suspicious, as it appears to possess some qualities similar to those of lead.

Whether cathartic substances might not sometimes be employed advantageously in this way, I have some doubt. It is said that the external application of cathartic medicines to the abdomen, as is sometimes done to children for the worms, has proved purgative in a high degree. But, on the other hand, I never found this excretion increased by sea bathing, even when the water was warmed. Whether some of the other kinds of purgatives might be more powerful in this way than the saline ones,† I cannot determine; but should think it far from improbable that the alvine excretion might be thus excited as well as that by the kidneys. If so, it might often be of

As cathartic.

* Vide Dr. Baker on the poison of lead. Medical Transactions, vol. I. II.

† Sea bathing will often prove aperient; but this seems only in consequence of its action as a cold bath, and not owing to any specific quality of the salt contained in it, as bathing in a common cold bath will have the same effect.

Contra indications of the WARM BATH.

of great service in many intestinal disorders, where the stomach is too irritable to retain what is taken by the mouth long enough to produce its effect, and clysters cannot be thrown up so high as to reach the seat of the complaint.

Contra Indications of the WARM BATH.

Contra-indications
of the
warm
bath.

I shall next proceed to make some remarks on the circumstances in which the warm bath appears contra-indicated, and to give some cautions relative to its use; and these I shall deduce from its known effects on the human body; on the informations on this head derived from experience, and the accounts given us by writers on the subject.

First, then, as to its mechanical action on the surface of the body.

Warm water applied to the skin softens and relaxes the part, and is on that account very properly forbidden in open * ulcers, especially in those where the digestion is
bad,

* Balneum quoque dum vulnus parum purum est, inter res infestissimas est. Nam id tumidum atque sordidum reddit. Celsus, l. v. cap. 26. §. 28.

bad, or symptoms of putrefaction appear. The latter of which the warm bath, by its increasing the heat of the part, and relaxing † it at the same time, ‡ is apt to promote.

The above reason holds stronger against employing it when there is any tendency to gangrene. § I imagine, for the same reason, it has been likewise suspected of increasing the disposition of the body in general to putrefaction, and has on that account been forbidden in contagious|| and putrid fevers; yet its good effects in the scurvy * have been acknowledged by several of the most able writers on the subject; though

† Cutis duræ mollities, distentæ laxatio. Hippocrates, de humidorum usu.

‡ Some cases are exceptions to this; as those wherein the inflammation and stimulus are considerable; as in some cancerous complaints, particularly of the uterus, which cannot well be reached by applications in any other form, wherein the relaxing and sedative effects of the warm bath are often of great service. I see it sometimes advised in such cases by Boerhaave.

§ Celsus cautions against the use of the warm bath in gangrene, l. 5. cap. 26. §. 34.

|| Vide Sir John Pringle's works, p. 326.

* Hoffman cautions against the use of the warm bath in the scurvy, if any external marks of putrefaction appear.

Contra indications of the WARM BATH.

though this disorder is undoubtedly of the putrid kind. Perhaps the proper distinction may be, that in those cases where its stimulus can be borne, and the increase of the diaphoretic secretion is of service, as in the scurvy, which is mostly caused by the diminution or suppression of this evacuation, there the warm bath is likely to be serviceable; but where these are prejudicial, as in putrid or malignant fevers, wherein this evacuation is already too much increased, there it is likely to prove detrimental. This objection does not affect medicated baths, if properly impregnated with antiseptic and astringent ingredients.

The warm bath is sometimes productive of bad effects from its rarefying qualities. Thus it is extremely dangerous in all cases where a considerable degree of plethora prevails, and ought never to be ventured on before that is reduced within proper limits.

Most of the sudden deaths which have been observed to follow warm bathing, are in all probability owing to a rupture of some vessel in the head from inattention to this circumstance. Nor is
the

the warm bath only dangerous on this account in cases wherein an actual plethora prevails, but likewise in cases where an artificial or temporary one is present, as in the case of inflammatory fevers, wherein its use would probably be productive of dangerous effects, as well as in the last-mentioned circumstances. It is likewise very dangerous in the temporary plethora, which is caused by repletion, or taking in a large quantity of food, either of the liquid or solid kind.

Juvenal, with great probability, attributes many of the sudden deaths that happened in his time to the custom of bathing too soon after eating.* The like may be said of its use too soon after taking in a large quantity of liquids, especially of the spirituous kind.

The warm bath is likewise improper in cases where, although no actual plethora prevails, yet where the sudden increase of the bulk of the fluids would be attended with danger. Of this kind are hæmorrhages,

* *Turgidus & crudum pavonem in balnea portas,
Hinc subitæ mortes.* . . . JUVENAL.

Contra indications of the WARM BATH.

hages, which it is found to excite very greatly.* And as those who have been once affected in this manner generally continue subject to them during their lives, in some degree, if the hæmorrhage is of the internal kind, especially the stomach; in such cases the warm bath † is not to be ventured on, but with the greatest caution.

For the same reason, the warm bath is improper in immoderate menstrual discharges, which it very powerfully promotes by its stimulus and rarefying qualities, and, by its relaxing ‡ effect likewise, prevents the contraction of the mouths of the vessels, and of consequence increases the discharge.

The

* Hippocrates cautions against the use of the warm bath in such cases.

† It is obvious that this caution is not meant to extend to cases wherein we want to excite a discharge of this nature, as of the hæmorrhoids, or from the nose, as in such circumstances its rarefying effects would promote such intention, and Hippocrates expressly advises it to those who have been subject to bleeding at the nose, which has prematurely stopped, in order to bring it back.

‡ This effect of warm water in increasing the flow of blood from an open wound, by preventing the contraction of the vessels, and the formation of a thrombus, or clot of coagulated blood, to fill up the orifice of the bleeding vessel, is exemplified in bleeding in the foot, where, without the assistance of warm water, little blood can be procured.

The warm bath also, though of great service in the scurvy when not very far advanced, must, I should think, be dangerous on this account in a very high degree of the disorder, as the solids are then very tender and friable, and the vessels very easily ruptured, as we know by experience. A sudden increase of the bulk of the fluids, attended at the same time with a considerable degree of stimulus, could not, in my opinion, be void of danger, especially since hæmorrhages in such a state are extremely difficult to be restrained.

Though the warm bath has been deservedly commended in disorders of the brain, particularly of the maniacal kind, yet I think great caution should be used in this respect, as I should apprehend in cases where any considerable degree of inflammation of the brain or its membranes had taken place, it might be dangerous both by its rarefying qualities, and the stimulus or irritation it occasions, which seems to affect the head particularly.

I should likewise be apprehensive of this effect of the warm bath proving pre-

judicial

Contra indications of the WARM BATH.

dicial in * phthifical complaints, which are found by experience to be easily excited by any increase of the circulation, or any stimulus of the inflammatory kind. The tendency to hæmorrhage from the lungs, (which almost always accompanies this complaint) renders the warm bath rather dangerous, for the reasons before given.

As the quality of which I have just treated is common to all baths, whether medicated or not, it is evident that in the above-mentioned cases they must both be equally contra indicated.

The warm bath, in some instances, may be contra indicated on account of the absorption

* A late ingenious writer, (Dr. Parr, vide his Thesis, printed in 1773) has cautioned against the use of the warm bath in those who are either afflicted with the asthma, or have formerly laboured under it, on a supposition of its increasing the disorder by rarefying the air in the chest, and thus occasioning more frequent inspiration.

That this reason has some weight, I do not deny; but am well satisfied its antispasmodic qualities are more than sufficient to counter-balance any effects of this kind. I have had experience of this remedy several times in this disorder, and always found it gave great relief; and have the satisfaction to find such a practice is consonant to that of several of the most eminent writers. The relief of the peripneumony by the warm bath, which is attested by many of the best writers, both antient and modern, is a strong confirmation of this, as the increasing the difficulty of respiration would be here full as dangerous as in asthmatic complaints.

forption of watery fluid, to which it gives occasion. Thus in dropfical complaints, where the cellular membrane is filled with water, and much frequently collected in other cavities of the body, as the abdomen chest, &c. and the skin itself in a bibulous state, a warm bath would seem likely to be highly injurious in increasing the quantity of watery fluid, already augmented to a noxious degree.

I have likewise sometimes found the warm bath injurious by its diaphoretic quality. When this disposition is preternaturally increased, as in the hectic fever, and some other cases of great debility, I think I have seen manifest injury done by the use of the warm bath, which in such cases seldom fails to increase this secretion, already too great. I imagine, likewise, that this quality of it is no small cause of its bad effects in putrid diseases.

OBSERVATIONS and CAUTIONS relative to the Use of the WARM BATH.

I shall next make some observations, and propose some cautions, relative to the proper method of using the warm bath.

As to the
degree of
heat.

First, then, as to the degree of heat.

I have before mentioned the degrees of heat which are included in the denomination of a warm bath. These, it is evident, must be varied according to the effect we desire to produce.

If the warm bath be used as a detergent only, it is not very material what degree of heat is employed, as any of them within the limits above mentioned will serve the purpose equally well.

The like may be said, in some respects, as to its effects when absorbed into the system, in diluting the lymphatic humours, washing out the glandular cavities, and dissolving saline acrimony, as, when it is once absorbed into the body, it must be soon reduced to the same temperature.— But it must still be observed, that a degree of heat, rather above than below that of the human body, is most favourable to absorption, as I have found by experience; and therefore I should imagine, as the quantity absorbed is here of considerable consequence, that the degree most favourable to this would be most eligible. Perhaps

haps this may vary in different constitutions ; but, by what I can discover, from 98 to 104 degrees of heat is most likely to succeed in such cases.

As to the rarefying effects of the warm bath on the fluids, no precise point can be fixed ; but by the best experiments it does not appear, that any external signs of this appeared until the heat was raised to 98 degrees, and was even very moderate at 100 degrees ; but after that, the external marks of the rarefaction of the fluids became very observable.

In cases, therefore, wherein this point is aimed at, I apprehend the heat should be at least 96 degrees,* yet I would not advise it much above 100, as in such cases, the strength is generally impaired, and the patients might find themselves, perhaps, more weakened or exhausted by the heat

H 3

and

* Vasorum in cute moles, five in partibus aqua immerfis, five in ipso vultu, nequaquam increfcebat, 96 deg.

Vultus tumor, & rubor exiguus, 98 deg.

Facies tumida, & rubra erat.—Vasorum moles vix augetur, 100 deg.

Turgebant vasa, facies multo magis rubra & tumidior erat, 102 deg.

Maxime turgebant vasa, facies ruberrima erat, 104 deg.

and evacuation, than relieved by filling the vessels in this manner.

If the stimulant qualities of the warm bath are desired in any considerable degree, as in the palsy, the heat should be as great as the patient is capable of enduring. Few can bear above 106 degrees at first going into it, but afterwards the heat may be increased (which should always be done pretty suddenly in such cases) to about 4, 5, or 6 degrees higher, or perhaps more. If a moderate stimulus is required, (as may be proper in the chlorosis, and other complaints of the cachectic kind) water from 98 to 106 degrees may be employed; but below the former of these it seems to possess little, if any stimulating powers. But in all these cases, regard must be had to the sensibility of the person who is to make trial of it; therefore the safest method is to begin at first with the lowest degree, and proportion the heat afterwards according to the effect thereby produced. I believe it may be safely laid down that, if the heat does not exceed 98 or even 100 degrees, no mischief from it as a stimulant can accrue in any cases in which it is likely to be made trial of; and therefore these
degrees

degrees of heat seem proper to begin with, in cases where we have any reason to fear any ill consequences from too great stimulus.

The point of heat at which its sedative or antispasmodic qualities are most powerful, vary considerably as to circumstances. Thus in the tetanus, in which the antispasmodic qualities of the warm bath * are exerted in a very remarkable and simple manner, Dr. Chalmers, whose practice in this respect is deservedly commended, used water of 96 or 98 degrees when the weather was warm, the pulse quick, and any preternatural heat on the skin. But when the pulse is slow, with little heat, he directs it to be so warm as to raise the thermometer to 100 or 102 degrees, especially if the weather be cold. This direction may serve as a good general guide in many disorders of the spasmodic kind, especially those which are not constantly or necessarily attended with fever, as maniacal and epileptic complaints, St. Vitus' dance, the hysteric and hypochondriac distaste, the convulsive

* Vide Medical Observations and Enquiries, vol. I. p.

convulsive asthma, and hooping cough, menstrual obstructions arising from spasm, calculous cases both of the urinary passages and of the biliary kind, and some cases of the nervous atrophy.

I do not find any account of the degree of heat that has been found most successful in the cure of intermittent fevers ; but as it is always used in the interval of the paroxysm, I should imagine from 100 to 104 degrees most likely to succeed, if the patient be strong, and circumstances favourable, as weather, time of the year, situation, &c. and in weak cases, where so great a degree of heat, and the consequent evacuation by perspiration, could not be borne, from 96 to 100 degrees may be employed.

In the low delirium of continued fevers, which frequently accompanies the kind called the typhus, a considerable degree of heat is necessary, as much of the antispasmodic virtue of the warm bath seems to depend on its stimulus. In this case then, from 100 to 104 or 106 degrees would be adviseable, and by the best account is found to

to be perfectly safe, and generally very efficacious. *

In the small-pox, a less degree of heat is mostly preferred, since too great a stimulus might there be dangerous. By what I can find, the bath is on such occasions generally heated from 96 to 100 degrees, but seldom higher.

The same rule, as to the degree of heat, may hold as to its use in other exanthematous disorders, in which this remedy is often employed with advantage.

In fevers, attended with local inflammation, as of the brain, pleura, lungs, bowels, † &c. the heat is generally advised to be moderate, ‡ yet still should be so warm as to obviate any rigor on going into it.

* The fomentations used in these cases in the hospital at Edinburgh, to supply the place of a warm bath, from which the best effects are observed, are generally heated to 120 degrees and upwards.

† Dr. Heberden mentions that the bath commonly used in this disorder is generally below than above the natural heat of the body. *Med. Transactions.*

‡ Alexander Trallianus cautions against the use of too warm a bath in such cases.

it. I should think from 96 to 100 a proper medium.

As to the increase of the diaphoretic secretion by the warm bath, it appears by Dr. Parr's experiments, that at 96 degrees the insensible perspiration was just perceivable, at 98 degrees it was copious, at 100 very much so, at 102 the sweat began to be visible on the face, at 104 it was very profuse, and the body was inclined to sweat during the whole day on using the least exercise, and at 106 large streams of it flowed down the face, and a most copious sweat over the whole body on going into bed after bathing, which did not appear when any degree of heat under 104 was used.

From this account we may draw some useful inferences relative to the degree of heat, which should be proportioned according to the quantity and nature of the evacuation desired.

When we wish only to restore the determination of the fluids to the skin, as is frequently the intention in the scurvy, increased alvine evacuations, the diabetes, and perhaps in some maniacal complaints,

from

from 96 to 100 degrees should seem most adviseable.*

* Dr. Alexander has very ingeniously shewn that this evacuation is confined to certain limits of the heat of the body, above or below which it does not take place. This point he supposes to vary in different persons, and in the same person, at different times; but he generally found it to be about 6, 8, or 10 degrees above what is natural to the constitution in perfect health. But when this heat exceeded 112 or 113 degrees, he never observed any sweat to appear. I do not in the least doubt the truth of this observation; yet I am satisfied that it does not hold of the heat produced by the warm bath, since I have often seen people sweating profusely in baths heated above the points just mentioned. Perhaps it may be alledged, that the heat of the body was not proportionably increased; but I do not see any reason to doubt that, since a thermometer applied to the body rose as high as when in the water. Dr. Parr also found in his experiments, that when the heat of the bath was below 102 degrees, the heat of the body was scarce affected. But from that point upwards, it kept pace with that of the water, in which it was immersed. Yet notwithstanding this great increase of perspiration, there did not appear that languor of spirits, or prostration of strength, as is found to be the consequence of profuse sweating in bed. On the contrary, I have generally found, by their own accounts, that the bathers were more alert and vigorous, and had a better appetite and digestion, on the days they bathed, than at another time. This difference in the effects of the same operation, produced by different means, may be owing to several causes. First, a person who sweats profusely in bed, lies a long time in a bath as it were of his own perspiration, whereby his fibres are relaxed and weakened, and the fluids themselves by the heat soon contract a putrid acrimony, as is manifest by the smell, and are, no doubt, again absorbed, and taint the juices of the body with a disposition of this kind, than which scarce any thing is known which so highly and speedily diminishes the strength. But in a bath the case is different, since there the perspired matter is washed off from the skin as soon as excreted, and all absorption prevented, as well as danger of cold from the linen and bed cloaths, which, if not very frequently changed,

When a large evacuation of this kind is required, as is sometimes thought necessary in the lues venerea, the rheumatism,* and by some in the gout, the heat may be raised to a greater pitch, as from 100 to 110 deg. or even higher; but I* confess, if I may trust my own experience, that I think
I have

changed, are apt to grow cold when charged with moisture. In the next place, the air which a person who is sweating in bed is compelled necessarily to breathe, is for the most part heated above the usual temperature, which is apt to induce a faintness, or weakness, and at the same time replete with vapours and animal exhalations, and generally in a stagnant state likewise. But in the baths where I made the above observations, the case is very different. The bathers breathe the open air, as the baths have no cover, which, by the difference of temperature of that part which is nearest the surface, from that which is above, is in constant agitation, and not loaded with any noxious exhalations. On this subject, Dr. Alexander very properly observes, that a person can bear twice as much sweating in the open air, as he can shut up in a room, or in a bed. This circumstance must, in many cases, be a great advantage, which the warm bath possesses in respect to promoting this discharge, since a larger evacuation may be procured by these means without so much loss of the patient's strength, and not near so much danger of corrupting the fluids of the body, and inducing putrid disorders.

* Dover's powder, which is commonly given in the rheumatism, generally produces an excessive discharge by the skin; but the same good effect is observed from small doses of James's powder, or other antimonial medicines, whose operation in this way is inconsiderable in proportion to the other.

* It must be owned, that less hazard attends a sweat raised by means of the warm bath, than other sudorifics, as Dr. Keill observes, that insensible perspiration is not diminished after the sweat has ceased, which was the case when that evacuation was procured by other means.

I have observed the same good effects in the cure of the above diseases from the milder diaphoretics, which have at the same time one great advantage, that they do not exhaust the strength in nearly so great degree. I cannot therefore avoid recommending, in such cases, always to try first the inferior degrees of heat before we go higher, since the cure by these means is much more agreeable, weakens the constitution much less, and is attended with less hazard of getting cold. If the warm bath is used as a diuretic, which I believe is not often the case, the heat must be still less than in any of the foregoing intentions. It appears by Dr. Parr's experiment, that this secretion was not excited when the heat rose above 96 degrees. Whenever therefore it is used with this intention, it must be below this point. To me the proper medium should seem to be, that degree wherein a person might remain without chilliness or sensation of cold, time enough to give occasion to a sufficient absorption of fluid; and this point, I should conjecture, might be fixed between 86 and 96 degrees, as the case and circumstances required.

This

This direction is not meant to extend to cases wherein the warm bath is consequently diuretic, as in the calculus, where it often acts by its antispasmodic and relaxing quality, enlarging the diameters of the ducts, so as to let the obstructing substances pass, but only where it directly affects the secretion itself.

As to the other qualities of the warm bath, as expectorant, sialagogue, and emmenagogue, no certain degree of heat can be fixed, as they are in all probability owing to its sedative and stimulant qualities, and not produced directly by any peculiar or specific action of the warm bath in promoting those evacuations.

Time of
stay in the
bath.

The proper time of stay in the bath, is next to be considered.

This as well as the degree of heat must be in a great measure regulated by the intention for which the bath is used.

If as a detergent only, which but seldom happens in medicine, no great nicety in point of time is requisite, and will be best determined by experience. If the quantity of fluid to be absorbed is depend-
ed

ed on, a pretty long stay in the bath will be necessary, which may be easier complied with, as the heat which seems most to favour absorption is that which is in general most agreeable to the sensations. I should imagine that from half an hour to an hour, or even longer, might be allowed as a proper time for staying in the bath.

If the rarefying effect of the warm bath on the fluids is expected, a moderate stay may suffice, as by the best computations the circulation is performed twenty-three times and upwards in the space of an hour; therefore, if the patient remains a quarter or one third of an hour in the bath, the whole of the mass of blood will in the first instance have passed nearly six times, and in the second nearly eight times, thro' the vessels which lie immediately under the skin, and nearly in contact with the water, and must in consequence have communicated the warmth thus acquired, to the whole mass, and thereby rendered the rarefaction equal in all parts of it.

If the warm bath be used as a stimulus, a short stay will, in my opinion, be preferable

able to a long one, since I have always observed, that when long continued in, it acts as a sedative, even though the heat be as great as can be borne. On this account, I would always advise where this effect is desired, especially in paralytic complaints, great caution, that the stay in the bath be not too long protracted, both on account of the sedative effects succeeding to the stimulant,* as is, I believe, constantly the case, and is directly opposite to the intention of cure, and moreover, because the evacuation by perspiration, which a long continuance in such a degree of heat as is commonly used in such cases is apt to occasion, is in these disorders highly prejudicial.

In my opinion, from ten minutes to twenty is the time most likely to succeed in such circumstances.

When the bath is used as a sedative, it is obvious from what has been said, that a longer stay is adviseable, especially if
any

* In Dr. Parr's experiments, the stimulant effects of the warm bath were observed to be most perceptible on first going in, and to be succeeded by sedative ones.

any relaxing effect is aimed at, as in the case of contraction of the muscles.

If the complaint be of the system in general, unattended with fever, as in maniacal, epileptic, hypochondriac, and hysterical disorders, &c, no very long stay is requisite, and I should imagine, from 20 minutes to 40 might in general serve the purpose. But in local complaints, where any peculiar obstruction is to be removed, as in calculous and icterical cases, the colic, menstrual obstructions, &c. a much longer time is often necessary, which admits of scarce any other limits than by the effect produced. The like may in some degree be said of its use in fevers and delirium; but we should always at the same time keep in view the intention with which it is used. Thus in some low states of fevers it appears to be antispasmodic by means of its stimulant quality; and this might suggest that the stay should be but short; in others it appears to act by its relaxing quality on the skin, as in the small-pox; and in others, to abate the inflammation by its more purely sedative qualities in lessening the increased
I motion

motion of the vessels, as in inflammations of the bowels, pleurisy, &c. in which the propriety of a longer stay is too obvious to need further remark.

As to the diaphoretic effects of the warm bath, the stay must be proportioned to the degree of evacuation we mean to promote, and to the heat of the water made use of. Thus in the scurvy, diarrhoea, and diabetes, where a determination of the fluids to the skin, or the restoring insensible perspiration only is attempted, a moderate stay, as from 15 minutes to 25 or 30 may suffice; but where sweating in large quantity is indicated, as is thought proper by many in the lues venerea and rheumatism, a longer stay, as from 30 minutes to an hour will be more conducive to answer that intention; especially as this evacuation seems to be the most copious when the sedative effects of the warm bath are most conspicuous.

On the warm bath as diuretic, I have little to say relative to this point. If the secretion be slow from any defect in the sensibility of the urinary organs, the same directions should be pursued as when it is
used

used as a stimulant. If the passages be obstructed by spasm or calculous concretions, it is to be regarded as a relaxant, and antispasmodic. If we desire to increase this evacuation by means of the quantity of fluid absorbed by the skin, a long stay in the bath, as being most favourable to absorption, will be most eligible.

As to the other indications, they depend so much on those already mentioned, that nothing more in this respect need be added concerning them.

The method of using the bath is likewise proper to be noticed. If the warm bath be used as a sedative to relieve pain or inflammation, or spasmodic complaints attended therewith, or fever accompanied with great weakness or delirium, the operation should be conducted with as little exertion as possible* on the side of the patient, who should be carried into the bath, and laid down on his back with

Method
of using
the warm
bath.

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the

* Hippocrates's directions to the person who bathes, are in such cases very proper :

Oportet autem eum qui lavatur moderatum esse & taciturnum, & nihil ipsum operari.

the head a little raised, and should continue in that posture during his stay in the bath, and be taken out again in the same manner in which he was put into it. When taken out he should be carefully wiped dry with soft cloths, but no more friction, than is necessary to remove the moisture, should be used. On coming out of the bath, he should be put either between blankets, or sheets moderately warmed; but great heat either of the bed or room is in all cases highly improper after this operation, as I have more than once experienced.

If its more active or stimulant qualities are to be procured, a different method must be followed. The patient should keep himself in motion, if he is able, all the time of his stay in the bath, and endeavour chiefly to make use of those limbs which are the weakest, or to extend those which are contracted; both which are frequently more easily done than could be expected, both from the support given by the water, and the stimulus and relaxing quality arising from the heat. On coming out, friction is extremely proper, and should

should be long continued, especially on the part or limb principally affected.

If he goes to bed afterwards, which I am far from thinking always so necessary as it is generally imagined, the bed should not be made warmer than to avoid rigor, nor should he remain so long there as to increase the perspiratory discharge, except in a moderate degree.* If the water be very cold, prudence directs against exposure to air, for the remainder of the day; but if that be very warm, and the patient's health will admit of it in other respects, I think such a restraint not only unnecessary, but injurious.†

I 3 *THE USE OF THE WARM BATH.* The

* The custom of putting the patients to bed, and sweating them profusely, is mentioned by Oribasius from Galen, who very justly blames the indiscriminate use of such a practice, which has been but too much in vogue in modern times. “Nonnulli sané medici post lavacrum laborantes involvunt, alii in linteis, alii in pannis, ac præsertim incuratis, eosque undequaque constipant ut plurimum sudent. At certe non opus est semper, laborantem post lavacrum plurimum sudare. Sæpenumero enim non ut evacuemus corpus ad lavacrum venimus; sed contra prorsus, ut humectemus irrigemusque per totum, id quod immoderate erat exsiccatum. Oribasius, from Galen.

† In Dr. Parr's Experiments, all those who made use of the warm bath exposed themselves to the air in half an hour's time^k, without receiving the least injury.

^k Which was then about 68 degrees.

Time of
day.

The time of the day at which the warm bath is most proper to be used, is to be considered likewise.

Most writers* concur in recommending the morning (and before taking food) for this purpose, and not without reason; since, at that time, digestion is finished, and the stomach empty, circumstances very necessary for the proper trial of this remedy. But, on the other hand, many cases wherein the warm bath is adviseable have great need of exercise, which can scarcely be admitted of in this way of management, except in warm weather, on account of getting cold. For this reason, bathing in the evening has been with propriety preferred in such cases, and has several advantages, as that it does not prevent taking moderate exercise in the open air, either on the day it is used, or the succeeding one, and likewise, being nearer the time of going to rest, is more likely to act both as a sedative and diaphoretic.

But

* Commodissimum balnei tempus est matutinum, post somnum concoctione peractâ & vacuo ventriculo. Hoffman, de baln. aq. dulc. usu.

But when it is intended to act as a stimulant, as in paralytic disorders, I think I have observed the morning to succeed best according to the old method of its use, perhaps as coinciding with the efforts of nature, which are then more likely to be exerted than in the evening, after the fatigue of the day. It is obvious that the above is only meant of chronic disorders, since in acute ones, where the patient is confined to his bed, or where any immediate effects are expected from it, as in fevers, delirium, calculous or cholicky cases, and such like, the time of the day is of little consequence.

The time of the year is likewise a circumstance in some cases necessary to be attended to.

Time of
year.

It has been generally observed at those places where the warm bath is most used, as at the warm mineral waters, that little service is done by them when used as baths in a severe season ; and some of the public institutions for the benefit of the poor shew this very plainly to have been the general and antient opinion, since they are confined to the six summer months, and during

ring the remainder of the year no provision is made, on the presumption that no benefit could be then received from the waters. Modern experience confirms this observation, which seems likewise consonant to reason as well as to experience.

When any benefit is expected from the stimulant qualities of the warm bath, as in paralytic cases, the summer months are undoubtedly the most favourable for such a trial, as seconding their effects; and, indeed, it is a common observation, that few medicines of any kind are effectual in this disorder while the weather continues severe. The same may be said, though perhaps not in so great degree, of other disorders in which the indications are of this kind.

Nor is it more effectual, in cold seasons, in giving relief as a diaphoretic, which effect of it is more obviously counteracted by cold than the former. On this account we see rheumatic complaints, gout, scorbutic disorders, diarrhœa, and some cutaneous affections, receive little or no benefit from the use of the warm bath in cold seasons.

sions, which are almost instantly relieved on the return of mild weather.*

The same rule holds, though the reasons are not so obvious, of its effects as an antispasmodic. We find, by experience, that in the winter months the warm bath is not near so successful in removing spasmodic contractions of the limbs, obstinate bowel complaints, and menstrual obstructions arising from this cause, as in the summer. I have likewise heard, from good authority, that the same is true of its use in maniacal and epileptic cases; and have myself seen an instance of it in the nervous atrophy, which seems to be a disorder of the spasmodic kind. I presume its failure in cases of this sort, under such circumstances, may be in a great measure owing to the dependance on, or at least connection of, its antispasmodic, with its stimulant and diaphoretic qualities.

But though the fact be undoubted, at least among us, that warm weather is favourable

* Rheumatism, gout, scurvy, and diarrhoea, from obstructed perspiration, are rarely seen in hot climates in comparison with us.

vourable to the good effects of the warm bath, yet great extremes of this kind have not been found most proper for a trial of it.* The reason of this in general appears to be, that in very hot weather, the use of
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* It may seem an objection to this position, that the Russians, and other nations still more northerly, as it is said, use the warm bath with great success as a remedy in almost all their disorders, and that in the very coldest weather. Nay, that they make the most sudden transitions, from the most excessive heat the body can endure, to the most extreme cold; and this without any ill effects being commonly observed from it, and often with great relief in their disorders. 'Tis even said that the rheumatism, which we might from our own observation think likely to be brought on by such management, is unknown in Muscovy. To what such a difference is owing, is difficult to explain; but we may observe, that the warm bath used in this way, is not only used medically, but is a common and frequent practice among the Russians, especially of the lower ranks; so that probably its effects are not similar to what such a practice might induce upon us who are unaccustomed to it. Besides, their baths are hotter, and always with a mixture of the vapour kind, which is very powerful in promoting perspiration. I imagine it is in order to take off the languor, faintness, and muscular relaxation, which so great a degree of heat induces, that they expose themselves afterwards to the cold, which being likewise in form of a cold bath, as they roll among the snow, and their stay in it but of short continuance, it is probable does not check the insensible perspiration afterwards more than a cold bath among us, which is not found to have that effect, and has even been used, as is said, with success in the rheumatism itself.

The mode of using the hot bath and cold alternately, was not unknown to Celsus, who, in the hydrophobia, directs, *Ut protinus a piscinâ in aquam calidam demittatur æger.*

It is observable, that he inverts the order in which it is used in Russia.

the warm bath is apt to increase the perspiratory discharge to an immoderate degree, which diminishes the strength considerably, which is contrary to the intention of cure, when used either as an antispasmodic or stimulant. Besides, in very irritable habits, the incautious use of the warm bath in hot weather, especially if heated to a great degree, has been productive of fevers and other inflammatory disorders.

As to the regimen and mode of life proper to be observed during the use of the warm bath, I know of none that is peculiarly applicable. In general, great moderation in the use of fermented liquors is proper, and of high dressed food; though sometimes, where the stimulus of the warm bath is indicated, as in paralytic cases, a greater latitude in these articles may be allowed. Moderate exercise, in most cases not attended with fever, is proper; and if the weather be warm, may be used on the day of bathing, after that is over, if it be in the morning, without danger of getting cold, as I have often experienced.

Regimen
proper
to be ob-
serv'd du-
ring the
use of the
Warm
Bath.

A moderately lax state of the intestinal canal has been likewise by all practitioners deemed

deemed proper to be preserved during the use of the warm bath. If this can be done by natural means, such as any proper variation of the mode of life or quality of food, it is most eligible; but if these are insufficient, recourse must be had to medicine.

The foregoing directions, as to the use of the warm bath, are to be understood in a general sense, and to admit of great variation from circumstances, such as age, habit, strength, &c. They are likewise almost altogether calculated for chronical disorders, and not to be supposed applicable when any immediate or sudden effect is expected from the warm bath, as in fevers, and other acute cases, for which no directions, except such as are suggested by the exigency of the case itself, can be laid down.

The DEGREE of IMMERSION.

Degree of
immer-
sion.

The next circumstance to be considered, as varying the effects of the warm bath, is, the Degree of Immersion; or whether the water be applied to the whole of the
body,

body, or to part of it only, as in the way of topical baths.

I have already treated of the effect of a warm bath applied to the whole body; therefore, the present chapter must be confined to topical baths only, or rather to the difference of effect between them and general baths.

Topical baths, then, differ from universal; 1st, in the degree of the effect produced.

That a quantity of hot water applied to the whole body, in form of a bath, must be a more powerful application than the same substance applied to a particular part only, seems to need little proof.

As a detergent, it is obvious those parts only can be affected with which it comes into contact. As absorbed, it may indeed affect the whole system, but in a less degree, as the surface which it covers is diminished, and the quantity absorbed, so in proportion.

The like is true of its rarefying effects in a still greater degree, as the blood is cooled.

cooled by passing through vessels contiguous to those parts which are not covered by the water.

As the surface to which it is applied is less, so must the stimulus of the warm bath, which is chiefly owing to the nerves of the skin; and the same is true, for a similar reason, of its sedative or antispasmodic quality, which depends in a great measure on the two last mentioned.

As the other qualities of the warm bath seem to be owing to the above, or rather modifications of them, 'tis needless to descant on each, since it is plain they must be in proportion to the primary quality from which they are derived.

2dly, Topical baths vary from universal in respect of their affecting the body unequally as well as in a less degree.

On this account is founded in part the doctrine of revulsion, which has, of late years especially, been a matter of great dispute among the learned.

To enter into this controversy at large, would take up too much room in a work of this kind, and is less necessary, as it
has

has already been handled by several able writers : I shall therefore give only a sketch of the principal arguments used by each party, and subjoin a few observations of my own.

The advocates for this doctrine reason thus :*——

When the feet, or any other part of the body, are immersed in warm water, the vessels of that part are relaxed, or become more readily distensible, by which, as they yield easier to the impetus of the blood, their capacity is increased, and of consequence a larger proportion of blood is accumulated in them, and its bulk in respect to the other parts proportionably diminished. In support of this it is alleged, that the veins of the parts covered with water become turgid and hard to the touch, that the head-ach and delirium accompanying fevers, which are imputed to
a fullness

* *Pediluvia humiditate sua temperate calida fibrarum totum in partibus inferioribus valde relaxant carnemque & cutim emolliunt, unde sanguis relictus superioris corporis regione ad ampliatas inferiores partes majori impetu ruit.*—Hoffman, de remediis ad sanitatem tuendam, &c. §. xviii.

Vide also Boerhaave, aphor. 396.—and Van Swieten's Commentary.

a fullness or plethora of the cephalic vessels, are relieved by the pediluvium, and the bulk of the parts that are immersed in the water is increased.

On the other hand it is replied, that if this were the method by which the pediluvium, or other topical baths, act, the vessels in the other parts of the body, which are not in contact with the water, should appear diminished in size as the quantity of blood which they contain is decreased; but on the contrary, that the vessels of the whole body, the head especially, soon grow turgid when the lower parts only are in the bath; and this happens in much greater degree as the heat of the water is increased, which is contrary to the foregoing theory, as they ought in such cases to be lessened as the relaxing power of the bath is increased, as is certainly true of it as the heat is augmented. The pulsation of the arteries in the head is much stronger, and a sensation of fullness and distention perceived in it, even though the water never rose higher than the knees. Besides, if the relief procured by the warm bath was gained by these means, the drawing
a quantity

a quantity of blood proportionable to the increased capacity of the vessels would have the same effect, and be more durable; but we know by experience, that most of the head-achs which find service from the pediluvium, are such as are not accompanied with fever or inflammation, but of the low nervous kind, and in such as stimulant and antispasmodic remedies are proper, and where letting blood is found injurious: That in inflammatory cases, especially where the brain is affected, the pediluvium is highly dangerous, and has often evidently induced a delirium instead of relieving it, and increased the pain of the head in similar circumstances: That the increase of the bulk of the vessels is owing to the rarefaction of the blood by heat, which is evident from the increase of them in parts of the body to which the water does not reach: That the same effect of it on the fluids renders it serviceable in head-achs, and other low nervous cases, which often arise from inanition. To these might be added, that many of its antispasmodic qualities, especially where the senses are affected, depend probably very much on the pleasing sensation it induces, which

is of much more consequence in such disorders than could be supposed to arise from a partial derivation of a small portion of the circulating fluids.

The pediluvium has likewise been used on a principle similar to the foregoing in the small-pox. It has been long observed of this disorder, that the degree of danger was to be estimated in a great measure from the number of pustules on the superior parts of the body, the head especially. If these were few in number,* the event was generally fortunate, and if very numerous, more danger was to be apprehended. With intent therefore to increase the number on the lower parts of the body, and thereby to draw down or derive the matter from those parts which are of more importance,

* Inculcabat semper auditoribus suis celeberrimus Boerhaavius ut inferiores corporis partes perpetuo foverent & laxarent ubi hujus morbi suspicio adesset, sive balneo, sive pannis laneis, emolliente decocto calido madidis, perpetuo applicatis, simul autem hoc fiebat, ideo quia sperabat maximam copiam materiæ morbosæ sic versus inferiora corporis derivare posse, & a superioribus partibus averti. Van Swiet. Comm. vol. v. p. 75.

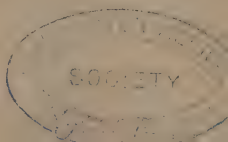
Dr. Huxham also used the pediluvium with intent to derive more powerfully the blood and variolous matter contained in it to the lower extremities. Vide his Treatise on the Small-pox.

importance, the pediluvium was introduced into practice, and seemed to answer the intention very successfully, generally procuring an alleviation of the symptoms, and an increase of the number of the pustules on the legs * and feet. But though the use of the pediluvium in the small-pox be justly recommended, I am inclined to suspect that its mode of action has been mistaken. It is far from being clear to me, that the increase of the pustules in one part of the body (which may at any time be done by keeping it particularly warm, especially if it be covered with flannel) decreases their number in another part, or that the increase of the eruption beyond the number that seem to come out spontaneously, is ever of service. In the inoculated small-pox, it is easy to increase the number by bringing the patient near a fire, or into a warm room; but this increase is always attended with symptoms which it is our intention to avoid as much as possible, and which vanish immediately on the retrocession of

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* It is certain, that where this method is used, a vast many pocks break out on the legs and feet.

Huxham on the Small-pox.



the eruption when the patient is removed into a cool place, or the open air. Nor does it appear that any increase of this kind lessens the number in the other parts, but more probably rather augments it, by adding to the irritation and fever, which is in a great measure in proportion to the eruption. Besides, the same good effects have been observed from bathing the whole body, in which case no such partial derivation could take place. I own I should have much greater expectation from the sedative qualities of the warm bath, in allaying pain and irritation, and procuring sleep, which it does in the best manner, and without the ill effect of opiates, than from any partial determination it occasions. I will not deny, that by softening the cuticle it may cause the eruption to be attended with less pain and trouble, and perhaps, as is said to be the case in some in whom this membrane* is more dense and hard than natural, which retarded the eruption beyond the due season, forward it properly in the manner intended by nature.

I have

* Vide Huxham, p. 138.

Some ingenious writers have attributed the peculiar mortality of the small-pox in cold countries to this cause.

I have heard it remarked by an ingenious practitioner, that though the pediluvium seldom failed of increasing the number of the pustules in those parts to which the water is applied, yet he never observed this effect when a bath to the whole body was used, although it seemed a more powerful remedy in allaying the symptoms. This I am confident is owing to the greater heat which is generally given to the pediluvium, than to the bath wherein the whole body is immersed. The former of these I have often observed to be of 112 or 116 degrees of heat, whereas the warm bath in feverish cases is scarce ever above 96, and much more care and attention is generally paid to the heat of this last than to the pediluvium. The feet are, indeed, able to bear a greater degree of heat than the trunk of the body, as the cuticle that covers them is considerably thicker, and more dense and hard. What confirms this opinion is, that I have observed when proper care has been taken not to raise the water of the pediluvium above the degree of animal heat, no increase of eruption on those parts followed, notwithstanding the same good effects were the consequence of using it.

On the whole then I think there is great reason to imagine that this theory, concerning the advantage to be gained by any topical application of this kind, is not founded in truth, and that no effect can be produced by a partial bath which a general one would not promote more powerfully, provided the circumstances, as heat, &c. were equal. I do not, however, mean to deny, that there is no choice with respect to the parts to which topical applications, even in general affections of the system, may be made. The feet are most generally bathed as most convenient, but we have no good experiments yet made with respect to the difference of effect in bathing them, or other parts of the body.

But although I think it highly probable that topical baths differ from general ones only in degree of effect, yet I allow that many circumstances occur wherein a topical application is preferable to a bath of the whole body.

In the first place, it is sooner and more easily procurable. Few situations, except where natural warm springs arise, or in capital cities, admit of the conveniencies
necessary

necessary for a warm bath to be always in readiness,* and therefore much time must be often lost in cases which demand the most immediate relief, 'in waiting' till such could be procured, and a sufficient quantity of water heated for the occasion. But a pediluvium, or partial fomentation, may be always had, as it requires little time or preparation, and is procurable by all ranks of people.

Another convenience is, that such applications may be made with much less trouble and fatigue to the patient. A fomentation may in general be employed with little change of posture, or need of raising the patient upright, which in some acute cases, especially fevers,† is a matter of great importance, and the latter of these may be said of the pediluvium likewise.

Another

* Hippocrates complains of this, in whose country the warm bath was much more in use than among us.

Quandoque vero minus eo (balneo) utendum est, propterea quod homines ad hoc sunt imparati. In paucis enim domibus præparata sunt necessaria instrumenta, & nec ministri, velut opus est, parati habentur. Hippocrates, de victu acutorum.

† Vide Hoffman, de situ erectio in morbis periculosis valdè noxia.

Another advantage of topical baths, especially fomentations, is, that they may be applied hotter than an universal bath; and thus in local complaints their discutient and antispasmodic effect upon any particular part may be increased. The heat of the fomentations in hospitals are generally 120 degrees, and often more, which is a degree that would be almost intolerable if applied to the whole of the body, but is easily borne when only a part of it is subjected to the operation.

Another circumstance in favour of baths of this kind, is, that they may be used in some cases wherein the others are improper. Thus an ulcer, or open wound, renders the warm bath unadvisable, as it can scarcely be prevented from coming into contact with it, the bad consequences of which have been before taken notice of; but this by no means contradicts the use of a fomentation, or partial bath, provided it does not touch the ulcerated part.

Such is my general opinion relative to topical baths. I have not attempted to decide on the particular cases or disorders in which they are peculiarly indicated, both
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on account of the bulk of the work not admitting it, and as I have before declared my opinion that they differ from an universal bath only in the degree of effect they produce; and that all their qualities may be explained by, and referred to, what has been already said in the first chapter.

The partial baths most commonly in use are a femicupium, or half bath, wherein the water rises as high as the waist, and a pediluvium, wherein the feet and legs only are immersed. A bath for the head only is met with in authors, and sometimes advised in the present practice, called a capitiluvium,* and a bath for the hands and arms, which has no peculiar name that I know of belonging to it. If any topical application to the other parts of the body be required, it is generally done in the way of fomentation, except when the water is thrown with some degree of force on the part, as when the stillicidium, or pumping, is employed, which is the subject of the following chapter.

MODE

* This partakes in some measure of the nature of a stillicidium, as that is the only method by which water can be applied to the head only, except in the way of fomentation.

MODE *of* APPLICATION.

The effects of warm baths likewise vary according to the mode of application, as whether the water be applied in the way of quiet immersion, or whether it be thrown with a degree of force on the part, as in the stillicidium or pumping.

The last of these differs from the former principally in that its stimulus is greater. I find, by experience, that the heat of the water is more sensibly felt when it is thrown with a smart stream on the part, than when the latter is quietly immersed; and that it is hotter on being taken out, retains its heat longer, and appears more red and swelled.

This may be owing to several causes. First, the heat of the fluid applied to the skin is really greater than if the part of the body had remained without motion in any warm bath, above the animal heat, and of the same temperature, since the particles of the water as they come into contact with the body must be cooled by it, and thus form a kind of watery atmosphere surrounding it of an inferior heat to that farther

ther removed. But in a stillicidium, this cannot take place, since the particles of water are there applied to the surface in quick succession, and do not remain long enough on the part to have their temperature altered sensibly.

Next, the stimulus is greater, from the force wherewith it is applied, whereby the subcutaneous vessels and glands are compressed, the circulation in the part rendered quicker, the contents of the glands emulged, and the absorption, as I should imagine, increased likewise. The hand is found to absorb a much larger quantity when well rubbed, before it be put into water, than without such preparation. Now the effect of pumping seems similar to that of friction, both in a mechanic view, and from its obvious effects in irritating the part to which it is applied.

On account of its superior stimulus the stillicidium is preferable to a warm bath in many local disorders, where a strong effect of this kind is desired.

Thus in partial palsies, it is frequently of great service applied to the part affected,

fect,* and sometimes to the place from whence the nerves that supply that part derive their origin, as in some affections of the lower extremities.

It is also preferable on the same account in discussing glandular swellings, gouty concretions, and other stubborn indolent tumours, which often yield to it after other means had failed.

It is almost unnecessary to observe, that nearly the same cautions are proper with respect to topical baths and pumping as to universal baths, though in less degree.

Form in which the fluid is applied.

I now come to the last chapter on warm bathing in general, which respects the form in which the bath is applied, as whether
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* Ubi autem medicatæ thermæ cum impetu profilientes, vel ex alto decidentēs, in partem paralyticam movent, & concutiunt satis fortiter, tunc sæpe pulchrè profuerunt; tales casus recensuit celeberrimus Cocchi. Verum Cælius Aurelianus in cura paralyfis dicit aquarum ruinis partes in passione constitutæ, sunt subjiciendæ, quas Græci κατὰκλυσμοις appellant, plurimam etenim earum percussiones faciunt corporum mutationem. Ubi pulchrè præcipuum effectum aquæ illabentis percussioni adscribit. Van Swiet. Comm. §. 1069.

the fluid be in its natural form, or as converted into vapour, called a vapour bath.

On this head it will be proper to say a few words on the subject of vapour in general.

All bodies with which we are acquainted have, by the application of a certain degree of heat, their component parts disunited, and reduced into a state of repulsion from one another, or at least of receding from each other. This was formerly thought to be the case only with fluids, and some particular solid bodies; but latter experiments prove that all bodies, even gold itself, are capable of being reduced into this state.

The degree of heat necessary to reduce bodies into this state varies according to the nature of the subject. It does not always follow the ratio of their specific gravity either in solids or fluids: Gold, indeed, which is the most ponderous of any substance, is with most difficulty brought into this state; but lead, though considerably heavier than either copper or tin, is dissipated in vapour by a much less heat.

heat. The same is true of fluids, which is more applicable to the present purpose. The nitrous æther, which is the lightest fluid known, is dissipated in the common temperature of the air; but expressed oils, which are of less specific gravity than water, require, nevertheless, a greater degree of heat to raise them in vapour. Whether the degree of heat necessary for this purpose be in any compound ratio of their specific gravity and tenacity, I cannot determine, but rather think it generally depends more on some specific qualities of the bodies not reducible to these heads. But this subject is too copious to be considered here with respect to bodies in general; I shall therefore confine myself to water only.

At what degree of heat the vapour begins to be visible from the surface of water, I cannot ascertain, and perhaps the point is not fixed, but varies as the boiling point does, according to the weight of the atmosphere. I have observed it in a slight manner, about 73 degrees, below which it is, I believe, seldom visible. This gradually increases 'till it comes to 212 degrees, which is generally held at a
medium

medium to be the boiling point; but at this degree the quantity of vapour discharged is prodigiously increased, being near twenty times the quantity to what was exhaled a few degrees below that point. Here it was formerly thought to stop; and that as the heat of the water in an open vessel could not be increased, so the evaporation could not likewise. But this is found to be an erroneous opinion, since by making it boil violently, the quantity evaporated may be still greatly augmented. At what point of heat the steam begins to be condensed is not determined, and indeed varies as the vapour is more or less concentrated. When diffused through a large space it requires a greater degree of cold to condense it than if it was compressed into a smaller compass. As to the mode by which heat acts in raising water in vapour, it is difficult to form any conjecture.

Since it has been discovered that air acts as a menstruum to water, and as the power of menstrua in general, and of air particularly, in dissolving bodies, is much increased by heat, we might be led to imagine

gine that something analogous happened in this case, and that the water by heating the air contiguous to its surface enabled it to dissolve a greater quantity; and that, as the air thus loaded with water became expanded by heat, and agitated by the motion on the surface of the fluids, it came into contact with air of a less degree of heat, which cooled it, and caused it to separate part of the fluid it had dissolved, which being in a diffused state, appeared like clouds, which form vapour assumes before the particles of water have, by attracting one another, formed drops sufficiently large to precipitate themselves downwards by their own gravity. But this opinion, tho' apparently plausible, is liable to several objections. That a considerably greater quantity of water is thus dissolved in the surrounding air, I have no doubt; but I am well satisfied that this alone is not sufficient to solve all the phenomena relative to vapour. Water when converted into this state is extremely elastic, so as to burst the strongest vessels, and lift the greatest weights; and on this principle it is used in the fire engine for drawing water from mines. But air loaded with water, either

in a diffused or dissolved state, has its elasticity diminished, and seems never so elastic as when it is in a state of absorbing water. Thus we find the barometer higher in the spring and summer, when by the winter's rains most of the moisture has been discharged from the air, and when the evaporation is the quickest; and the same is true of clear frosty weather, in which moisture is found to be absorbed very rapidly by the air. Besides, water dissolved in air, like other solutions, does not injure its transparency; but vapour is always turbid, even in its most elastic state. I suspect, too, that the vapour of water is not miscible with the air of the atmosphere. In the fire engine, mentioned above, when the jet of cold water has been let in, a vacuum is formed in the place before occupied by the air; and this is so complete, that a process of the same kind has been proposed as an improvement of the air pump, as procuring a more perfect vacuum than could be gained by any other means. Besides, the effect of heat in increasing the power of menstrua, seems to go on in a pretty regular proportion with the degree of it applied; but in this case,

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the evaporation is surprisingly augmented in passing from the degree next below the boiling point to that at which it commences. To me, the repulsive quality with which the particles of water are endued towards one another in a certain degree of heat, and their attraction towards each other, or disposition to unite when the heat is diminished below a certain point, seem more similar to an electrical quality * than any that I can suggest. But I mention this only as matter of the most distant conjecture.

The effects of a vapour bath upon the human body have been in general represented as similar to those of warm water. But in some instances they are thought to possess the same powers in a higher degree.

Thus vapour has been thought to possess greater † relaxing and dissolving powers,

* Electricity is found to have a very remarkable and sudden effect in condensing vapour. I have been informed that if an electrified wire be brought into contact with the steam issuing from the spout of a tea-kettle, that it will be instantly precipitated in drops. To this quality is probably owing those great and sudden showers which generally accompany thunder.

† Longe potentius laxat & resolvit omnia tepidus aquæ vapor quam aqua calida. Docent hoc durissima cervorum cornu

and of consequence to be more efficacious in rigidities of the limbs, and obstructions of all kinds, than water in its usual form. To prove this it is said, that the hardest horns of deer are softened by means of steam, which could not be done by boiling them the same time in water. But I suspect the case is not here fairly stated, as to a comparison of the effects of water in the above-mentioned states. When hartshorn is intended to be softened by these means, it is shut up in a close vessel, and the steam, and water from whence it proceeds, have no communication with the open air, by which the heat is raised many degrees above the boiling point, and acts in the same way with Papin's digester, which it is well known will, by the heat of the water alone, reduce the hardest bones into a pulp or jelly in a short time.

If the effects of water and vapour were compared on an equal footing, the event would have been found very different. I

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cornua quæ spagyrica dicta in officinis præparatione mollescent satis citò dum aquæ ebullientis vapori exponuntur, quod diuturna etiam coctione fieri non tam bene posset. Van Swiet. Comm. §. 606.

allow a confined steam may have greater dissolving powers than water boiled in an open vessel, as it may, and will be of a greater degree of heat; but am certain that animal substances are sooner softened and dissolved by being put into a vessel of boiling water, and kept boiling, than by being suspended over the steam of it.

Of late years it has been customary to dress both flesh, meat, and vegetables, in this way, especially such as we desire to preserve the form most entire, as chicken, &c. and the more tender vegetables. But it has been always found that it took much longer time to bring them to the same degree of tenderness than if they had been put into the water itself. I made the experiment myself with one of these steam pots, which are very well contrived for the purpose of such a trial. I took two pieces of the same meat, of equal sizes, one of which I put into the water, and the other into the vessel above it, into which the steam rises. After the water had boiled twenty minutes, I took the vessel from the fire, and examined the pieces of meat; that in the water was considerably softer, and more pulpy, and of a whiter colour
than

than the other, which had been exposed to the steam only. I have repeated this experiment several times, with various kinds of meat and vegetables, and always found the event similar to that just mentioned. But granting the dissolvent powers of vapour to be as great as is represented, it is certain that it never could act under that form upon any obstructions generated in the human body, since it must be condensed into water before it could penetrate so deeply. The body is not capable of sustaining more than 120 degrees of heat, which is greatly below that point which is necessary to keep water in the form of an elastic vapour. I therefore look upon all reasoning of this kind, drawn from the effects of vapour on other substances, granting them to be as considerable as is represented, to be frivolous and unsatisfactory, because it cannot be applied to the surface of the human body, much less penetrate to the interior parts, in that state which its dissolvent effects are most observable. The steam of water has been by some writers represented as more penetrating than the water from which it arises. To prove

this the following experiment has been adduced :

“ Put a little falt of tartar into a glafs
“ pan, and tye a piece of dry bladder over
“ its mouth: Now boiling water may be,
“ for a long time, poured on this bladder
“ without getting thro’ its pores, whereas
“ the fteams of fuch water gain an imme-
“ diate admiffion, which they demon-
“ ftrate by diffolving the falt almoft as
“ foon as they are applied.

I have tried this experiment myfelf repeatedly with the fteam of boiling water much hotter than could be fufained by the human body, but always found that a bladder, when carefully tied in the manner before mentioned, was impervious to moifture, both from vapour, and when immediately applied in contact with boiling water itfelf. If kept long in boiling water, its texture was fo diffolved that it came in time to admit moifture through its pores; and poffibly this might be the cafe with fteam, if long continued; but I can fay, from experience, that a bladder will refift fteam much longer than it will the immediate contact of boiling water.

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As to its stimulus, vapour seems to the senses less stimulant than the immediate contact of warm water; and by what I can observe, from experience, is so in reality, as the pulse was not quickened by it so much as by water of the same degree of heat. It is obvious that it must on this account be less serviceable than a bath in the common way, in cases where the stimulus of the warm bath is of service, as paralytic cases, &c. but on the other hand it may perhaps be thought preferable in some cases of great irritability, as in maniacal cases, or delirium accompanied with inflammation of the brain or its membranes. But in the general cases of fevers, which are found to have received the greatest benefit from warm bathing, I doubt if the common mode of using the warm bath be not preferable to vapour. Most of those which Dr. Gilchrist has related, seem to have been of the low nervous kind, wherein a gentle stimulus was evidently indicated, and of consequence this quality of the warm bath probably contributed greatly to its good effects in removing the disorder.

As

As to the comparative effects of the warm bath, in its usual form, and in form of vapour, as antispasmodic remedies, I cannot well determine : Perhaps, as in the last instance, vapour might be more eligible in some cases accompanied with great irritability; but I am satisfied that in many cases the usual form of a warm bath would be far preferable, as I am clear much of its antispasmodic virtue depends on the peculiar and pleasing sensation induced by the water (in a body) coming into contact with the skin. This is exemplified in a remarkable instance related by Dr. Whytt,* where a spasmodic cough was restrained by immersing the feet in warm water, when neither heat and moisture, either separately or combined, or warm steams, or vapour, had any such effect.

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* It remains, therefore, that warm water, by its particular action on the extremities of the nerves to which it is applied, renders the whole system less sensible of any irritation. Whytt's works, p. 610.

It appears, from the above experiments, that warm water affects our nerves very differently, not only from a dry heat, but also from warm steams, or cloths dipt in hot water; a fact which seems not to have been known, or at least not sufficiently attended to, and which perhaps may afford some useful hints in practice. Whytt's works, p. 610.

I have likewise myself seen cases, both of biliary calculi, and those of the urinary passages, where fomentations have been ineffectually tried, (even though they were impregnated with narcotic ingredients) wherein the pain has * instantly ceased on entering the warm bath. I never had an opportunity of making the experiment comparatively in internal inflammations, as of the bowels, lungs, &c. but from analogy we may with great probability conclude, that the event would be similar. Dr. Porter has observed very properly, on the bilious colic, “ that attempting the cure by
“ fomentation is an insufficient, defective,
“ and partial method, in comparison with
“ immersion in a warm bath, which is an
“ universal focus to the lower trunk of the
“ body, whose application to the part is
“ the same, its warmth much more equal,
“ and the extent of its relaxing influence
“ perfect and general on all the abdominal
“ region.”†

But

* The sudden ease procured by the warm bath in such cases, proves that it is owing to the sensation it occasions, as it is too quickly procured to be supposed to be owing to any other qualities.

† Edinb. Medical Essays, vol. III.

But even supposing the vapour applied to the whole body, we have no reason to think it would prove equally antispasmodic with a warm bath in the usual form, since the sensations they induce are by no means similar; and when compared, (as in the case related by Dr. Whytt, which seems to be a fair trial, as no more of the body was exposed to the action of the water than was to the steam) the effects of the warm water were by far more powerful.

With regard to their diaphoretic qualities, it is difficult to make any comparison. When the body is immersed in water, the matter perspired is washed off, and mingled with the water as it issues out; and when a vapour bath is used, a considerable quantity of steam is always condensed on the surface of the body, which makes the perspiration to seem greater than it really is. But the quantity discharged in both cases is probably very large, when the heat either of the vapour or of the water is raised to 104 degrees, or above. In Dr. Parr's experiments we find, that at 104 and 106 degrees of heat of the bath, the sweat flowed in large streams from the face, and

and we may suppose the discharge was not much inferior in those parts of the body which were covered by the water. The vast discharges of the same kind procured by steam, and the evacuation of the water in dropical complaints by the like means, are great evidences of this. Whether the discharge in the last instance may be greater than in the former, on account of the less resistance it meets with in being thrown outwards,* I cannot determine; but if we may judge from circumstances of a similar kind, as the evacuation of urine in a bath, or the flow of blood from a vein, as in bleeding in the foot, the projectile force outwards seems but little diminished by the pressure of the surrounding water, and consequently in all probability the perspiration but little affected.

As to the other effects of the warm bath as diuretic, expectorant, sialagogue, and emmenagogue, they depend so much on those already mentioned, that the comparative

* Van Swieten prefers vapour baths on this account for the removal of obstructions. *Partes enim corporis aquâ immersæ comprimuntur, vapor autem omnia laxat.* Van Swiet. Comm. §. 127.

rative efficacy of steam and water in these respects may easily be inferred from what has been already said.*

But though I am much inclined to believe that vapour baths are inferior in efficacy, as to their general qualities, to a bath in the usual form, yet several circumstances may occur which render a vapour bath more eligible: First, then, it may be applied without taking the patient out of bed, or so much as altering his posture; a thing of great consequence in many weak cases, especially of the febrile kind, wherein the raising the patient to an erect posture has frequently induced the most alarming symptoms, and even death itself. This inconvenience is entirely obviated by some late improvements made on the machines used for that purpose, whereby the steam is conveyed gradually between the bed cloaths to all parts of the body, without the least necessity for any effort or exertion on the part of the

* I shall speak more of the comparison of medicated baths in the usual form, and medicated vapour, when I come to speak of the substances that may enter into the composition of a vapour bath. What has been said here relates only to simple water and its vapour.

the patient. Another convenience of vapour, is, that it may be more gradually applied, both with respect to quantity and the degree of heat. By increasing or lessening the diameter of the tube through which it passes, which is easily done by means of a stop cock, the steam is entirely under our command in both these respects, and may be more easily removed altogether than a bath in the usual form. Fomentations indeed possess several of the above-mentioned advantages, but then their effect is but partial; whereas the vapour bath has the advantage of being either general to the whole body, or applied to any particular part only, as occasion may require. Vapour has likewise this great advantage over all fomentations, that the heat communicated by it is more equable, and may be easier kept to any certain pitch for any length of time, whereas fomentations are liable to great uncertainty in this point, being generally too hot when first applied, and often before they are removed grown so cold as to counteract in some measure their former effect. Besides, the frequent opening the bed cloaths, which is necessary (when fomentations are employed)

ployed) in order to change them, is apt to let in a stream of cold air on the part which had been just before exposed to a great degree of heat, and moreover fatigues the patient, from both of which inconveniencies vapour is totally free. Vapour is likewise much less liable to wet the bed cloaths than moist fomentations; a circumstance of no small consequence in cases of great debility, where no change of these can be had from the danger of moving the patient.

Another great advantage of vapour above every other form of a bath, is, that it may be applied to parts of the body which a bath in the usual form either could not reach, or be conveniently applied to them. Thus vapour may be easily conveyed to the lungs, if judged necessary, by inhaling it with the breath, which a fluid in any other form could by no means reach, and indeed this is the only method by which any application whatever can be made immediately to those organs. This is a matter of great consequence to be attended to in disorders of those parts, which frequently require a speedy and efficacious remedy, both of which qualities are frequently

quently found in vapour, in cases of inflammation and obstruction.

The same may be said of the advantages of vapour in inflammations of the trachea and larynx.

Vapour likewise furnishes a commodious application to several other parts of the body, which a fluid in its usual form, tho' capable of being applied, could not so conveniently reach, or remain in contact with, especially if they were in a tender or inflamed state. This is the case with inflammations of the eye, of the inner parts or membranes of the ear, and of the fauces, uvula, œsophagus, and the adjacent glands, to all which steam forms an easy and agreeable fomentation, which is much more constant, and of easier use, than gargles, lotions, and such like applications, which require frequent renewal, and much more effort on the side of the patient, and motion of the parts affected, as in gargling, which is often very disagreeable when they are in an inflamed state."

I shall now add some general remarks on the composition of a vapour bath, or of what substances it may consist;

On the Composition of a VAPOUR BATH.

A vapour bath may be considered, as well as a bath of water in the usual form, as simple, or of the steam of water only, or compound, when other bodies are joined with the water, whose specific qualities arise with the steam, and render its effects different from those produced by the steam of simple water. It is relative to the last of these, viz. medicated vapour, that I here propose to treat.

I think it may be laid down as a general rule, that no substances can be properly employed in this way whose efficacious parts will not rise along with the vapour of boiling water, and be retained (in part at least) by that vapour when its heat is diminished to such a degree as to be tolerable to the human body in general, and even to the more tender parts of it, to which vapour is often applied.

On this account a vapour bath is much more confined in its number of ingredients than one in the usual form; many substances which impregnate water very strongly with their virtues not being sufficiently

sufficiently volatile to rise in the degree of heat here employed, and of consequence improper to be used in this way. I shall consider the substances that are proper for this purpose, in the same order that I did before when I spoke of medicated baths.

SALINE SUBSTANCES.

All these, as being intimately and permanently miscible with water, enter very properly into the composition of a bath in the common form; but only a part of them are sufficiently volatile to rise with the degree of heat here employed, and consequently admissible among the ingredients of a vapour bath.

The vitriolic acid is, in a certain state, extremely volatile; but I do not imagine much use could be made of this quality here, since, on its being diluted with water, (as would be necessary to be very largely done because of its acrimony) it becomes fixt, and on that account useless in such intention. The nitrous and muriatic acids are, in the state we generally get them, sufficiently volatile; but even these, when largely diluted, lose this qua-

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lity in a great degree, and the vapour arising from them in their dilute state has very little acid impregnation. I never heard of any of the mineral acids being ever employed with the intention of being applied in form of vapour as a bath to the body; but I see Gaubius* has advised an antiseptic vapour, with a view to purifying the air from pestilential infection, which is intended to consist of a mixture of the nitrous muriatic and vegetable fermented acids united with the steam of water.

The native vegetable acid, as found in the juices of fruits, is nearly as difficult to be raised in vapour as the mineral acids; but this is by no means the case with the vegetable

* Vapor Antiloimicus.

R Aceti vulgaris, pintas ij.

Sal marini,

— nitri,

Ol. vitrioli vulg. ana lib. ss.

Aq. puræ, pint. j. m.

S. Immissa in ollam fictilem vitreatam, repandam, super prunas reposita, in limine domus aut cubiculi leniter, sine ebullitione, evaporent, & cum vapor acrior exsurgit, nova subinde aqua infundatur. Gaubius, de methodo concinnandi formulas medicamentorum, p. 312, 313.

In the above recipe the vitriolic acid is used only with intention to decompose the nitre and sea salt, and consequently to set their acids loose from their alkaline bases.

vegetable acid produced by fermentation, such as vinegar, which easily rises in steam, and is generally employed where an acid vapour is desired.

The most common use of this is in topical applications, as to the mouth and fauces in the ulcerous* and inflammatory† fore throat, to the lungs in the pleurisy‡ and peripneumony, when it is inhaled by the breath, and sometimes, though less frequently externally applied, for resolving glandular indurations,§ as of the breasts.

* And I also directed the fumes of red rose-leaves, chamomile flowers, myrrh, and camphor, boiled in vinegar, to be drawn in with the breath very often, as hot as the patients could bear it, which gave great and speedy relief. Huxham on the ulcerous fore-throat.

† Vaporarium particulare, emolliens resolvens, ad anginam inflammatoriam.

R Aceti sambuci,

—— rosarum,

—— calendulæ, a ʒi.

Aq. still sambuci, ʒvi. m.

Vapor calidus hauriatur infundibuli ope in fauces. Gaubius.

‡ Vide Sir John Pringle on diseases of the army, p. 144.

§ Vapor laxans aperiens discutiens ad mammarum tumores.

R Florum sambuci,

—— chamæmel,

—— meliloti,

—— lavendulæ, ana man. j.

Sem. cumini, ʒi.

Conscissa, tusa, mixta, exhibe.

M 2

S. Species

It is either tried alone, or made the vehicle of other substances.

Sometimes, though more rarely, it is used in general applications to the whole body;* though in this case no great stress seems to have been laid on the efficacy of

S. Species, quarum pugilli duo infundantur cum aquæ fermentis & aceti vini ana $\frac{3}{4}$ iv. ac per horam macerentur vase clauso. Fervefacti deinde liquoris vapori nuda exponatur mamma, superne stragula contexta; quo per quadrantem horæ continuato, molliter cum panno laneo, sicco, calido, fricetur, moxque emplastro de spermate ceti super alutam extenso foveatur. Repetantur eadem bis, ter, quotidie; at nova quovis mane infusio paretur. Gaubius, de formulis medicam. p. 313.

* Balneum vaporosum universale nervinum antiparalyticum.

R Herb. majoran.

—— menth.

—— mari syriac.

—— fol. rec. cochl.

—— summ. recent rutæ,

Flor. chamæmel.

Baccar juniperi, ana man. j.

Concisa, tusa, mista, digere in phiala altâ chemicâ cum aceti & spir. vin. vulg. ana q. s. per diem & noctem.

Liquor bene calidus, una cum speciebus, in ollam repan-dam effusus reponatur in loculum fornicis sudatorii ac scilicibus candentibus subinde injectis fervens detineatur. Sub fornice decumbens æger ingesto prius decocto attenuante vapores excipiat nudo corpore ut sudet per semihoram & ultra si vires ferunt sudoribus deterfis fricetur pannis laneis calidis ficcis villosis præsertim ad partes paralyti affectas tandemque jussulo vinoso reficiatur. Gaubius, de form. medicam. p. 311. quoted as from Boerhaave's *Mat. Medica* to his aphorisms, but not in the last edition.

of the acid as an ingredient in the composition.

It is necessary here to observe, that although vinegar is very properly employed in this way, on account of the volatility of its acid, yet that we must not expect the same effect from the vapour as from the contact of the vinegar itself, since the acid in the former always rises in a more dilute state. This is well known to those who make use of vinegar for pickles, who always find that by boiling, its acidity is increased, which can only be by the dissipation of its watery parts, which are first carried off in steam.

Of alkaline salts, the fixt alkali, either vegetable or fossile, being not volatile in so small a degree of heat, can have no place as an ingredient in the composition of a bath of this kind. But the volatile alkali is extremely well adapted for this purpose, being extremely volatile in the lowest degree of heat possible to be employed, and is on that account in frequent use. It may be conveniently used, either by itself, as when the volatile alkali in a simple state is added to the liquor from

which the steam is raised, or by decomposition of some of the neutral salts, as sal ammoniac, by addition of quick lime, or fixt alkali. If either of the latter of these be added to a solution of sal ammoniac in boiling water, the volatile alkali will rise with the steam in the same manner as if it had been in substance dissolved in the water. I see volatile alkali is employed as an emmenagogue in the way of vapour, joined with other substances of similar virtues, in Fuller's Pharmacopeia Extemporanea,* and think it bids fair to be full as efficacious in that as well as many other instances, as in any other mode of external application.

As to neutral salts, I never heard of any of them being employed in this intention. None, except the ammoniacal salts, will rise in distillation without being decomposed; and, I believe, the degree of heat which is usually employed in this case is scarce sufficient to elevate even the ammoniacal salts in any quantity sufficient to
place

* Page 324.

place any dependance on their effects. I think then that they may be excluded.

INFLAMMABLE BODIES come next under consideration :

Of these, sulphur comes first in order.

Whether this substance, in its simple state, can be admitted into the composition of a medicated vapour bath, I cannot determine: Sulphur in this state is not, properly speaking, soluble in water; yet notwithstanding, it seems capable, even when mechanically diffused, of being elevated along with the vapour of the water. This is shewn at Aix-la-Chapelle, where pure sulphur is found sublimed upon the upper parts of the passages through which the course of the spring lies. This makes it probable that it might prove an efficacious ingredient here. We know that when united with oily bodies it finds an easy admittance into the system, when externally applied. Now in this case the perspiration, which partakes of this quality in a great degree, is generally plentifully diffused over the body, being called forth by the heat and relaxing quality of the vapour.

pour. The sulphur, elevated with the vapour, will probably unite with the oily matter of the perspiration, and be absorbed into the body, whose pores are at that time in an open state.

Several natural vapour baths, of the sulphureous kind,* are found in the neighbourhood of Volcanos, where the steam issues through clefts in the rocks; and some of these are applied with success in the same disorders in which sulphureous applications are indicated. Whether these are of this kind, or of *hepar sulphuris*, no accounts that I have seen are sufficiently explicit to determine. If thought necessary, a vapour bath of this kind may be easily imitated in private practice.

But in my opinion, *hepar sulphuris*, where a sulphureous vapour is required, would be more eligible than sulphur in its native form. The former possesses all the effects, usually attributed to sulphur, with a much greater degree of volatility. That made with the volatile alkali rises more easily,

* A native vapour bath, which seems to be of the sulphureous kind, is described by Celsus near Baie in Italy.

easily, as appears by its stronger odour; but the hepar sulphuris, with fixt alkali, serves very well for the same purpose, and I believe only differs in degree of volatility from the former, as the fixt alkali itself seems volatilized in a great measure by its union with sulphur. Nay, even the combination of sulphur with quick lime gives some marks of volatility by its exhaling a pungent sulphureous smell when concentrated, though it loses this, as well as its distinguishing taste, when largely diluted with water. The warm springs that contain sulphur under the above forms, afford excellent opportunities for baths of this kind, especially those whose native heat is sufficient to exhale a plentiful vapour. Aix-la-Chapelle, whose springs are so extremely hot, is admirably adapted for such a purpose, where I find it is put in execution, and used with good success.* A like attempt was made at Bath, at the abbey baths, by his Grace the late Duke of Kingston, but hitherto it has not been sufficiently tried to ascertain its effects.

Some

* Vide Dr. Williams on the waters of Aix-la-Chapelle and Borset, page ix.

Some contrivance of the like kind might easily be put in execution at the sulphureous waters in other parts of the kingdom, though these could not come up to those just mentioned in point of convenience, as the water would require to be artificially heated for the purpose. If the native sulphureous waters are not to be had, an artificial preparation may be easily substituted, which will nearly answer the same intention. When the specific qualities of sulphur are depended on, I think it full as likely to succeed in this mode of using as if the water of a bath in the usual form was impregnated with it.

OILY SUBSTANCES are next to be considered.

Of these, expressed oils, though considerably lighter than water, yet require a much greater degree of heat to raise them in vapour, and are therefore improper subjects for a trial of this kind.

But, on the other hand, essential oils are extremely well adapted for this purpose, as they in general rise plentifully and easily with water, and intimately blended with the steam, though their nature is not altered

altered by the mixture. They are most conveniently exhibited by making an infusion of the vegetable itself, whose essential oil is intended to be used. Sometimes Spirits of wine, or vinegar,* and sometimes both united, are used instead of water, but I think improperly, as spirits of wine bring over little essential oil in distillation, because they rise with a less degree of heat, and consequently come over before the oil has begun to rise, and vinegar hardens the texture of vegetable substances, and renders them less apt to give out their volatile parts. Those vegetable substances seem most proper for this purpose which contain what are called, though improperly, light oils, or those which rise with the vapour of water lightly boiling.

In general, the degree of impregnation which they impart to the simple water distilled from them, may be a good guide to our choice in this respect. The native† aro-

* Vide vapor laxans aperiens, &c. and balneum vaporosum universale nervinum antiparalyticum, before quoted.

† I see the flowers of elder, chamæmel, and lavender, leaves of mint, marum, rue, thyme, scurvy grass, favine, rosemary,

matic, and foetid plants of our own growth, are generally employed for this purpose, as being cheapest, and easiest procurable, and giving out their essential oil freely to the vapour of the water in which they are boiled. In general, the aromatic plants are best suited to this purpose, as their oil rises with a less degree of heat than that of the foetid ones. The same general rules for the preparation of the substance should be observed as are given in the two first articles of the directions for the distillation of the officinal simple waters in the Edinburgh Dispensatory.

In my opinion, this is as convenient and efficacious a manner of obtaining the effects of essential oils (with respect to their external use) as any that can be contrived, as they are applied in a tolerably concentrated form to the skin, at the time when the pores are most open to receive and absorb them.

Under this head, though not strictly belonging to it, I shall consider how far some other

rosemary, and wormwood, together with juniper and bay berries, and cummin seed, all used by Gaubius, and many more, might with equal propriety be tried.

other qualities of vegetables may be expected to be found in a vapour bath.

First, then, the gummy or mucilaginous parts, which are generally used as demulcents, or emollients. Neither of these, it is well known, rise in distillation with any heat that could be employed here, and on that account are utterly unfit subjects for a vapour bath.* On this account, Boerhaave, in his formulæ to the aphorisms,† has improperly recommended several emollient herbs with this intention, which impart no qualities to the vapour, and consequently must be at best useless, besides the hazard of their burning to the sides of the vessel, and thus tainting the steam (which is here directed to be taken

* Some little of the mucilaginous parts of vegetables seems to rise in the distillation of the common simple waters, as appears by their growing thick, or *mother* on the surface as it is called; but this is too little to place any dependance on, as it does not, when first distilled, make any perceptible difference in the consistence of the liquor.

† § 858. Vapores emollientes.

R Folior. malvæ,
 — bisfalvæ,
 — mercurial.
 — parietar. ana man. ij.
 Farin. sem. lini, 3ii.

Cum aq. decoctum. Vaporem excipe cum aere adducendo.

in by the breath) with a nauseous empyreumatic flavour.

Nor are the astringent parts of vegetables elevated in vapour, and of consequence cannot be properly employed with this intention in a bath of this kind. This is evident from the simple distilled waters, several of which are drawn from substances that possess a pretty high * degree of this quality, yet no traces of it are to be found in the simple water, distinguishable either by the taste, or the nicer test of their striking a black colour with a solution of iron in an acid, although many other qualities of the plant are preserved in a high degree. The astringent qualities of vegetables remain in tolerable perfection in the extracts with water, † (which is another proof of what I have just said) though even these are abated in their astringency by long coc-
tion;

* As cinnamon and rue. Nay Dr. Lettsom relates a strong distilled water drawn from a pound of green tea to a pint of water; though it possessed the flavour and other qualities of the tea in such a degree as to be poisonous to animals, yet struck no black colour with solutions of iron in acids. A slight infusion of tea, it is well known, strikes a deep black colour with solutions of that metal.

† As in the extract of logwood, of guaiacum, and of the Peruvian bark.

tion; but this does not seem to happen from the astringent quality flying off with the vapour so much as to its being altered in its nature by the long continuance of the heat used in the boiling.

The same observation holds good of the bitterness of vegetables. Thus we see the simple water distilled from rue, though it retains the whole of its smell, and great part of its pungency, yet has no bitter taste, but leaves that quality entire in the extract. On this account, no vegetable substances are proper for a vapour bath that are employed on account of this quality, as it will not unite with the water in that state.

Nor are the antiseptic qualities of vegetables likely to be exerted in this form. Those which are common to all vegetables seem to reside in the herbaceous juice and native acid, and the peculiar or specific antiseptic qualities to be owing to the bitterness or astringency, either separate, or a mixture of both, in the same substance, which combination is observed to be more powerful than either of them separately taken.

Now

Now none of the above-mentioned qualities will rise with the vapour of water, and of consequence the substances containing it cannot be of any service with this intention when employed in this manner. For this reason the Peruvian bark, whose antiseptic virtue is so great in external applications, in the way of bath or fomentation, is utterly useless in this form, as the parts on which its antiseptic properties depend cannot be applied where we wish them to be exerted.* I will not deny that the essential oil which all aromatic vegetable substances possess, and which will rise with vapour, may have some degree of an antiseptic quality; but this can be but small, as we find this property in full force both in the decoction and the extract from which the essential oil must have been dissipated in the boiling.

Ardent

* The following directions of Newmann, for the choice of proper subjects for distillation, may not improperly be applied to a vapour bath :

“Vegetables in general, possessed of any considerable smell, flavour, aromatic warmth, or pungency, give over those qualities to water in distillation, whilst bitterness, sweetness, astringent, purgative, emetic, unctuous, mucilaginous virtues remain behind in the still.” Neumann’s Chem.

Ardent spirits, as spirits of wine, may be, and I believe frequently are employed in form of vapour, both simple, and as a vehicle to other substances. The former of these they suit very well, but in the latter case their use is more limited, since their volatility, and quality of rising with a small degree of heat, is apt to make them rise before the heat is sufficient to elevate the qualities of the substance they were intended to carry along with them. Thus it is observed of the spirituous distilled waters, that most of them partake less of the specific taste, odour, and other qualities of the subject, than the simple waters of the same kind, which is owing to the cause just mentioned. I see it is sometimes used, joined with vinegar;* and their combined vapour is thought to be extremely powerful as a stimulant, resolvent, deobstruent, &c. How far it differs in its effects on the human body from that of either of the substances separate, or from that of common water, I cannot determine. In general, when spirits are used for this purpose,

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* Vide Boerhaave's formulæ to the aphorisms, §. 1068, 1069. and Gaubius de formula medicam. p. 313.

pose, it is safest to dilute them pretty largely with some liquor, not spirituous, as vinegar, or water, on account of the danger of their catching fire if used in a concentrated state.

The combination of vinous spirits with the mineral acids, commonly called æther, may be properly considered here.

Of these there are two kinds in use: The most common is that made by the union of the vitriolic acid with spirits of wine, and another with spirits of wine and spirit of nitre; both these are not ill suited in their composition for topical applications of this kind, as being extremely volatile. The great difficulty is to confine the vapour to a fixed point, and prevent its too quick evaporation; and I have seen some very simple machines, which seem to answer both these purposes at once perfectly well.

I have known the vitriolic æther made use of in this way in disorders of the organs of hearing, but without any sensible effect. No great success was expected, as the case had been of long standing; but the trial proved its use in this way to be at least

least without danger. If thought necessary, it might be conveyed with equal ease to any other part of the body. The nitrous æther might, I doubt not, be tried with equal safety, as it is, if well made, equally free from acrimony; but I never had any experience of its effects.

Metallic and earthy substances, not being any of them volatile in the heat of boiling water, are entirely out of the present consideration, and can never properly enter into the composition of a vapour bath.

Of watery bodies, or of the steam of simple water, I have before spoken.

Of aërial bodies, none but fixible air can be thus (medicinally) employed. This has of late years come into reputation in external as well as internal application; but in this way it is generally used by itself, and not united with vapour, and of consequence in that light does not come under the present consideration; yet I am not without some doubt if, in some cases, it might not be more efficacious if combined with the vapour of water.

In the scurvy, the pores of the body are generally shut, and the obstruction of the perspiratory discharge is even thought, by many able writers, to be absolutely necessary to the production of this disease. The good effect of the warm bath in relieving this disorder is generally attributed to its diaphoretic qualities; but these are likely to be more efficacious towards the cure if conjoined with antiseptic ones, which seems to be the case in the present combination. The great difficulty seems to be, to procure a sufficient supply of fixible air for such a purpose; but this may easily be done at those places where any springs, containing fixible air, and of a sufficient heat to exhale a plentiful vapour, break out, by conveying the water as soon as possible after its rise under a floor perforated in many places for the passage of the vapour upwards. Several contrivances of this kind are to be found at the foreign hot baths, and might easily be executed in our own country.

If intended for topical application only, it may be easily used in any place, by adding the fermenting substances separately

to

to the water (first heated) from whence the steam is to rise.

Fixt air seems to unite well with water in a state of vapour, as it does with it when in its usual form, and on that account is properly combined with steam.

I have thus finished the first part of this work, which I mean as explanatory of, and introductory to, what I shall say in the second part, on the external use of the Bath waters. It has indeed run out to a greater length than I either wished or expected, yet I could not shorten it upon the present plan, and only fear the reader will find it in many parts rather defective than redundant. But I shall reserve my apologies to the end of the whole work.

Since the first part of this work was printed off, the following accounts of the effects of warm bathing were communicated to me by my ingenious and worthy friend, Dr. Haygarth, of Chester.

EXPERIMENT I.

A person in the hospital there, of 34 years old, whose complaint was a pain of

the shoulder, unattended with fever, was on June 20th, 1774, at seven in the evening, put into the warm bath. The heat of the bath room was 60 degrees, that of the bath itself 105. Some time during his immersion, a douche, or stream of water was let fall on his shoulder, of 124 degrees of heat. His stay in the bath was 15 minutes. Before immersion the pulse beat 86 times in a minute, and during immersion 110 times. The heat of the hand before going into the water was 98 degrees, during his stay in it 102. The urine secreted in the hour before bathing amounted to six ounces, but in the hour ensuing only to three ounces. The weight of the patient before bathing was 191 lb. and after it 190½ lb. Sweat moderate during the time of bathing, and afterwards.

EXPERIMENT II.

A person in the same hospital, aged 31 years, under a venereal complaint, was at nine in the evening put into a bath of 110 degrees of heat. The pulse before going in beat 64 times in a minute, during his stay in it 120, and after coming out 80. The time of immersion was ten minutes. The

The weight of the body before going into the bath was 143lb. $\bar{3}$ iv. and after coming out 143lb. $\bar{3}$ iiifs. The sweat was profuse, and the veins appeared swelled.

EXPERIMENT III.

Some time afterwards, the last-mentioned patient was again, at five in the evening, put into a warm bath of 114 degrees of heat, and suffered to remain there 15 minutes. The weight of the body on going in was 143lb. $\bar{3}$ iv. and after coming out 143lb. $\bar{3}$ iiifs. as before. The pulse beat before bathing 73 times, during the stay in it 114, and after coming out 78 times in a minute. Sweat profuse, and veins swelled.

EXPERIMENT IV.

A person under the same complaint, 42 years of age, at five in the evening went into a bath of 114 degrees of heat, and remained there 15 minutes. The weight before immersion was 154lb. $\bar{3}$ iv. and the same on coming out. Pulse beat before 65, during the stay in the bath 110, and afterwards 84 in a minute. Sweat profuse, and venous system swelled.

EXPE-

EXPERIMENT V.

A person in the last-mentioned disorder, aged 34 years, was at the same hour mentioned in the last case put into a bath of 114 degrees of heat, and kept there 15 minutes. The weight before immersion was 123 lb. and the same afterwards. The pulse before entering the bath beat 62, during the stay in it 69, and after coming out 60 times in a minute. Sweat profuse, and veins swelled.

EXPERIMENT VI.

A person aged 34 years, with a fixt pain in the shoulder, but without fever, was at five in the evening put into a bath of 93 degrees of heat, and remained in it fifteen minutes. The pulse before going in beat 72, during the stay in it 84, and after coming out 70 times in a minute. The sweat was little, and the veins not obviously enlarged. The urine secreted in an hour and 40 minutes before using the bath amounted to $\bar{3}$ vi. and nearly that quantity was secreted in the like time afterwards.

The above experiments agree nearly with those made by Dr. Parr on the same subject.

ject. The pulse in all was rendered quicker, the perspiration increased, and the veins swelled, when the water rose above 100 degrees. Below that mark it increased the number of the pulse, but the perspiration and venous system were not obviously affected. Dr. Haygarth's experiments were made with a considerably greater heat than Dr. Parr's; yet I do not find by his account that any inconvenience ensued. It is likewise observable, that in the first experiment of Dr. Haygarth's, the heat of the bath, when as high as 105 degrees, evidently diminished the urinary secretion, and when as low as 93 degrees, did not seem to promote it, which the warm bath did, in Dr. Parr's experiments, when as high as 96 degrees. But these differences must be expected in various trials; and I am rather inclined to think that Dr. Parr would be generally in the right, as his experiment was more frequently repeated, and with nearly the same event, and as it seems to be the most probable course the absorbed fluid could take, as it scarce seemed to increase any of the other evacuations.

In

In order to throw some light on the question of the fluids' absorption, Dr. Haygarth procured the patients to be weighed before going into the bath, and on their coming out again. In two instances the weight had not suffered any sensible alteration, and in three others it was rather diminished. This might seem to make against the theory of absorption; but it should be considered, that the difference of weight proves only the difference between absorption and the evacuation by sweat, insensible perspiration, &c. which were here probably very large. Dr. Parr mentions in his experiments, that at 106 degrees the sweat flowed in full streams down the face, and certainly this evacuation must have been much greater in these instances, in one of which the heat was raised 4 degrees, and in three others 8 degrees higher than in Dr. Parr's experiments. The loss of weight was obvious, and necessary, and how this could have been replaced, except by absorption, I am at a loss to imagine. I have no doubt then that the absorption, as well as evacuation, is very considerable; but at the same time I confess I see no clear method of proving the

the real quantities of either. They both seem to vary greatly under different circumstances. I have before related in some experiments at the beginning of this work, that I found the absorption greatest when the perspiration was least, as in cold weather, and before meals,* and vice versa; and probably, by the accounts we have of its effects in fevers, of rendering the mouth moist, and increasing the other secretions, it is still greater in such circumstances, especially

* When the stomach is empty, it has been long observed, that the body is in an absorbing state, even from the air. Dr. Chalmers, in the well-known story of the negro, (who, to the disgrace of our countrymen, and of human nature, was gibbeted alive by his inhuman masters in South Carolina, and exposed to perish by hunger and thirst, and the scorching rays of a tropical sun) relates, that though neither meat or drink were given him, he regularly voided every morning a large quantity of urine. The dews of the evening, as Dr. Percival observes on this case, imbibed by the body, supplied a superabundance of fluids in the night, and a sufficient quantity to support perspiration in the day. I much suspect that had Dr. Haygarth made these experiments in a cold season, and in cases attended with a defect of perspiration, as in fevers, the absorption would have been found much greater. In the experiments I have related myself, the absorption was probably greater than what is computed, as no account was made for the perspiration, which must certainly have increased the bulk of the water. Probably to this is owing the fact which has been long observed, that infection is more apt to be taken from contagious distempers when the stomach is empty than when full, and the caution so often given to physicians not to go out to visit such patients without previously taking in food.

especially if we give credit to the story related by Dr. Simpson, of St. Andrews, before mentioned.

The above experiments of Dr. Haygarth's confirm greatly, in my opinion, the theory of the expansion of the blood by heat, since, without any increase of quantity of fluid, and without any partial derivation of it to any particular place, except perhaps to the surface of the body in general, which yet we have no proof to support, the veins appeared enlarged, even on the face, which the water did not reach, and consequently could not directly act on by its relaxing qualities.

As to the other effects, they seem to agree as far as related with those which I represented it to possess, being evidently stimulant at first, and rather sedative in its consequences. In two of the cases mentioned the pulse was slower after the trial of the bath than before it, and probably this would have been the case with more, had the examination been delayed a little longer 'till the stimulant effects had ceased. The increase of the diaphoretic secretion was also very remarkable. The diuretic quality

quality of the warm bath seemed indeed to fail; but it was only tried in one instance, where the heat was such as this effect could reasonably be expected, and its failure of exciting this secretion probably owing to some particular disposition of the patient. As to the other effects, they are either less remarkable, or else of a secondary nature, and of consequence do not come under the head of experiments made to determine its immediate effects.

quality of the woman's health is not
 to be left, but it can only be in the
 hands, where the heat was such as this
 effect could reasonably be expected, and
 as history of medicine this position pro-
 bably coming to the particular dispo-
 sition of the patient. It is not, how-
 ever, that the effect is not, in the
 case of a temporary nature, and it is
 possible to not, under the head of
 medicine, to be determined its im-
 portance.

P A R T I.

On the External Use of the Bath Waters.

I Come now to the Second Part of this volume, in which I propose to apply what has been observed of warm bathing in general to the external use of the Bath waters.

In doing this, I shall follow as nearly as possible the same order with that observed in Part I.

First, then, as to the heat of the Bath waters.

In this view, the Bath waters may be considered as warm baths, from 112 degrees (which is the heat of the hottest part of the King's Bath) when used as general baths, to any degree below that point

point that may be desired.* In topical applications, as pumping, the heat may be raised higher, to 116 degrees, owing to the surface of the water not being exposed to the air, as in the bath. In this respect the Bath waters possess all the advantages of which thermæ are capable, as the above-mentioned degrees are equal to any effect that we should wish to be produced by a warm bath on the human body by a considerable heat, whilst at the same time they possess all the advantages of other natural springs of an inferior degree, to which their heat is easily reducible, if their native one be too great. This is a circumstance of great consequence with respect to topical applications, as pumping, which is of little efficacy, unless the water be at least as warm as the body to which it is applied.

As to the quality of the fluid :—

In this light the Bath waters may be looked on as medicated baths, consisting of

* A warm bath of the Bath waters, of any inferior degree of heat, may be had at the Abbey baths; and the same is intended to be put in execution at the Hot bath by the Corporation, but is not yet finished. In the present state of the public baths, the heat is scarce ever below 102 or 100 degrees.

of hepar sulphuris, with quick lime, selesites, common salt, a small portion of iron, (dissolved by means of the vol. vitriolic acid) and fixible air, united with water. For the experiments in proof of the substances that enter into their composition, I refer to vol. I.

As to their effects on the body, I shall speak of them comparatively with those of simple water.

First then, as to its effects on the surface as detergent.

Bath waters as detergent.

Viewed in this light solely the Bath waters are inferior to simple water. They curdle soap, and are found improper for washing linen, and other domestic purposes in which this quality is required. Of course then, where cleansing the skin from adhering foulness was the sole object, a bath of simple water would be preferable; but this indication rarely occurs in medicine; and moreover, the difference of effect, even in this respect, upon the human body is so small as not to merit much regard.

O I believe

As softening and relaxing the cuticle.

I believe, likewise, that it is less powerful than simple water in softening and relaxing the cuticle,* probably on account of its astringent and saline ingredients; but this difference also is too trifling to make any variation in its effects of any consequence in medicine.

As antiseptic and astringent.

Bath waters likewise possess an antiseptic and astringent quality, neither of which belongs to common water. But whether these are in sufficient degree to be of much importance, merely as acting on the surface of the body, exclusive of the consideration of the waters being absorbed, I am in doubt.

As to the quantity absorbed.

I do not find any difference worthy notice between the Bath waters and simple water relative to the quantity absorbed.

As to their rarefying effects.

As to the rarefying effects of the Bath waters on the fluids of the body, it is obvious that they must be the same with those of common water of the same degree of heat.

As

* I found a piece of meat much softer after being boiled an equal time in river water, and even in common spring water, than when Bath water was used.

The mechanical operation of the Bath waters on the body then do not differ sensibly from common water; but when we consider their action upon the nervous system, the variation is more evident.

Some gentlemen of the profession, for whose opinion I have the highest regard, have expressed great doubts to me if the Bath waters, externally applied, could differ in their effects on the body from common water of the same degree of heat. Not to insist at present on the general opinion of mankind, or on any particular comparative facts relative to their respective effects, which shall be afterwards related, I confess, in point of argument, I can by no means see any reason why a fluid, whose effects taken into the stomach are so different from those of common water, might not exert different ones applied to the surface of the body. The absorption of fluids by the skin is a point, I think, as well ascertained as most in physiology; and we find, by the best accounts likewise, that no decomposition or alteration of nature happens in the substances dissolved in the absorbed fluid. Dr. Alexander found nitre more diuretic in this mode of exhibi-

If their specific qualities can be absorbed by the skin from their use as baths.

tion than when taken by the mouth, and the bark to be equally efficacious in the cure of an intermittent; the first of which experiments I have myself several times repeated, always with success. The particles of cantharides, externally applied, affect the neck of the bladder in the same way as taken internally; and I have even seen this happen in a slight degree from the use of an embrocation, in which tincture of cantharides made a large proportion, although not sufficient to vesicate the skin.

Tinct. Thebaica likewise, externally applied to the pit of the stomach, is a common and efficacious remedy in the stopping of vomiting, as I have myself more than once experienced.

Some of the saturnine preparations also, externally used, have affected the part to which they have been applied, and sometimes the whole system, in the same manner as might have been expected from their internal use.

If the effects of medicated substances have been thus exerted in external topical application, I see no cause to deny our assent to the possibility of the Bath waters exerting

exerting their specific effects when applied to the whole body, where the surface is so much larger, and probably some parts of it more absorbent than those to which topical applications are generally made. The chalybeate, sulphureous, and aërial impregnations, are held in perfect solution by the waters, and therefore as likely to be absorbed together with the fluid, as the solution of nitre before mentioned, and more so than the specific qualities of the bark, whose union of its active particles with water is much less complet.

It should seem that when we desire to introduce any medicines into the body, to alter the quality or consistence of the fluids, as diluent or antiseptic remedies, or to affect the glandular system, that this method would be preferable to taking them by the mouth, as they would be more immediately conveyed to the parts desired without suffering any alteration from the digestive process.

But to return to the subject :—

The Bath waters, used as a bath, are more stimulant than common water. I

O 3

have

Bath waters more stimulant than common water.

have found, by repeated experiments, my own pulse increased both in number and strength more by a pediluvium of the Bath water than by one of simple water of the same heat. The former increased the number from 12 to 16 beats in a minute, but the latter never exceeded 9, and seldom so many. I have not had myself an opportunity of observing the comparative effects of Bath water with simple water, when used as a bath to the whole body; but I have observed of those who bathed in the baths here, that the pulse has been more increased in number by the same degree of heat, than is mentioned either in Dr. Parr's or Dr. Haygarth's experiments* on that subject. I have almost always found the pulse raised to 120 in a minute, and this in a shorter time than Dr. Parr mentions, and in subjects where I had no reason to suspect any increased irritability. The same gentleman relates, that after bathing, the body broke out into violent sweats on the least motion through the rest of the day. I have

* I tried these experiments at the Duke of Kingston's bath, where the heat is equable in every part of it, which is not the case in the public baths. The heat of them, when at the highest degree, is from 104 to 105 degrees.

have often enquired of those who have bathed here, if this effect was similar in them to that just related, and much the greatest number have assured me that this tendency was very little increased, and in several not at all. And so far from being relaxed or weakened by its use, I have generally found that the bathers were more alert and vigorous, and had a better appetite on the days of bathing than in the intervals.

The bath guides likewise, many of whom every morning remain several hours in the water, do not seem at all relaxed or weakened by such a practice, but on the contrary are in general robust, vigorous, and long lived, and most of them inclining to corpulency.

Fainting, likewise, which a warm bath of common water is so apt to induce, happens very rarely in these baths, although the stay is generally longer than in a common warm bath, and the people who use it are often in a very weak state both of strength and spirits.

Dr. Charleton likewise relates a case of a paralytic patient, whose lower limbs had
lost

lost both motion and sensibility. The warm bath was tried on her with a temporary relief during her stay in it, but on coming out both motion and sensibility were again presently lost. The Bath waters, externally used in this case, entirely cured her, which was probably owing to their superior stimulus, which appears in this case not only to have been greater, but more durable.

More antispasmodic.

I am likewise inclined to think the Bath water more antispasmodic than common water, used as a bath. But here I would be understood to mean such cases only where stimulants are proper, as its superior antispasmodic quality seems to depend on its greater stimulus. A comparative proof of this quality is difficult to ascertain by positive experiment, as the simple warm bath itself possesses it in so great a degree, independent of any impregnation. But the sudden and quick relief procured by bathing here in cases of the spasmodic kind, the obvious superior stimulus of the Bath waters, which is here indicated, their great antispasmodic qualities taken internally, and the great reason we have to think these may exert their proper and specific

specific qualities on the nervous system, even when externally applied, give us the greatest reason to think that the opinion of their superior efficacy in this way is not ill founded.

Whether the Bath waters used in this way are more diaphoretic than common water, I cannot determine. The perspiratory discharge in both is very considerable, but I suspect less in these baths than in simple water, probably on account of some of the saline and astringent parts in their composition. I have observed several whose strength would ill bear a large evacuation of this kind, (which an ingenious writer observes, and what I have found by experience to be true, to be the most weakening of any, in proportion to its quantity) endure bathing in the public baths here without any loss of strength, but rather an increase of it. This, no doubt, was in part owing to the stimulant and corroborant qualities of the waters, which prevented so great loss of strength; but I am inclined to attribute it in some degree to the evacuations not being so great, which I have often observed. I have before mentioned, that the tendency to

Probably
less dia-
phoretic.

to perspire during the day after is much less than when common water is used, and likewise, that it promotes an evacuation of another kind considerably more than common water, which is seldom the case when that by perspiration is increased at the same time.

More
diuretic.

I find, from repeated experience, that the Bath waters, used in this manner, are more diuretic than a bath of simple water. Dr. Parr found, in his experiments, that the urinary secretion was not increased when the heat of the water rose above 96 degrees; and Dr. Haygarth mentions, that as low as 93 degrees it was not obviously augmented; and when as high as 105, diminished one half. But I have frequently observed this secretion to be increased when the heat of the water was greater than any of these here mentioned, and scarce ever found it diminished.

I have found, likewise, in several cases, the Bath waters to promote expectoration very powerfully; but whether they do this in a greater degree than common water, I have not had an opportunity of ascertaining by experiment.

The

The same is true of their effects in promoting the salivary discharge. But their comparative qualities are here of little consequence.

The Bath waters prove likewise very efficacious in promoting the menstrual discharge, and I think more so than can be reasonably attributed to common water. But of these I have not had an opportunity of a fair comparative trial. Of this, as a secondary effect, I shall speak more when I come to treat of the indications for which the waters are adapted.

INDICATIONS *of* BATH WATERS.

In treating of these, I shall not repeat what has been before said of the mechanical action of the warm bath on the human body, or of the indications derived from thence, but refer back for an account of these to the first part of this work, as the Bath waters are not supposed to possess these in a greater degree than common water.

I shall therefore proceed immediately to speak of it as indicated from its effects on the vital and nervous system.

First,

As stimu-
lant.

First, then, of the Bath waters as stimulant:—

Of disorders that require medicines of this kind, the palsy is the principal.

In palsy.

The use of the Bath waters externally in this disorder is almost as ancient as any accounts we have of them. Notwithstanding the many relations from the best authorities of their general success in this disorder, the late Dr. Mead, undoubtedly from very partial experience, has utterly condemned their use, in the most positive terms, in every species and stage of this complaint. Indeed, his general observation on warm bathing in this disorder, seems only to be drawn from what he has remarked of the Bath waters, which were less liable to such an imputation than common water. But this charge has been already refuted, with invincible argument and authority, by the ingenious and learned Dr. Charleton, who has proved, in the clearest manner possible, that Dr. Mead's opinion was not only contrary to that of others, the most eminent in their profession, and whose sentiments on this head were founded on actual experience, but also

also repugnant to the most indubitable authority in point of fact. It appears by the register of the Hospital, that from May 1751 to 1764, 1053 paralytic patients were admitted, out of which 813 were cured or benefited, and only 43 died in the hospital;—a very small proportion in so dangerous a distemper, and what fully confirms Dr. Mead's assertion; who has represented the bad effects of the Bath waters as exerted in bringing on an apoplexy just after their coming out of the bath, so that the deaths caused by the Bath waters must have most of them come into the hospital account, as the effects were so immediate. But I do not find, by the best inquiries I can make, that of those who have died of this complaint during the use of the waters, that more of them died soon after coming out of the water* than any other time. Accidents of this kind may, no doubt, happen; but as Dr. Charleton observes, very judiciously, “why ascribe the return of the disorder to the
“ use

* Ipse quidem novi nonnullus qui cum vana medicorum
pe delusi ad thermas nostras Bathonienses profecti essent ex
qua calida egressi mox iterum apoplexia correpti sunt ac pe-
iere. *Mead. monita & precepta medica.*

“ use of warm bathing? since this disas-
“ ter happens to those who have never
“ used the warm bath.” For my part,
if this accident should happen, I should
no more ascribe it to the warm bath
than to the bed from whence he arose
that morning. It is natural, as the ex-
cellent writer, before quoted, observes,
“ for men to be governed in their judg-
“ ments by what falls under their own
“ observation; hence it is that we are too
“ apt to draw general conclusions from
“ the bad or ill success of a few particular
“ cases; but it is on full and repeated ex-
“ perience, not on partial or casual, that
“ aphorisms in the art of medicine are to
“ be drawn, or can be well founded; and
“ therefore, as the evidences here are
“ both numerous and decisive, I shall
“ not hesitate to affirm, whatever autho-
“ rity there may be to the contrary, that
“ bathing in Bath water is useful in pal-
“ lies.”

Having ascertained this general position,
I shall now enquire to what kinds of pa-
ralytic complaints the Bath waters are best
adapted.

First,

First, then, they are observed to be particularly efficacious in those paralytic complaints that owe their origin to external cold. This is a very common cause of paralytic disorders among the lower ranks of people, especially if moisture be mixed with it, and the transition from an increased heat to a considerable degree of cold be sudden. Boatmen, fishermen, and others, whose occupation leads them into the necessity of remaining long in cold water, are frequent subjects of this disorder, and make no inconsiderable proportion of those admitted into the Bath Hospital. The success of the baths in such cases is in general very happy, and sometimes succeed when the disorder has remained a long time; though such cases often require a long stay to complete the cure. Out of twenty-four patients of this kind received into the Bath Hospital from May 1751 to May 1764, only two received no benefit, and none died in the Hospital;—a convincing proof of the efficacy,* and likewise of the safety of the baths in such cases.

I have

Palsy from
cold.

* The baths of Aix-la-Chapelle, which are of the sulphureous kind, are found very serviceable in this kind of palsy. Vide Dr. Williams's Treatise, case xiii. xiv. xv.

Palsy from
heat.

I have likewise seen an instance wherein the Bath waters proved extremely efficacious in the cure of a paralytic stroke, owing to an opposite cause, violent heat. This often happens, it is said, in hot countries to the reapers and mowers,* from insolation or exposure to the sun's rays; which was the case in the present instance. Various remedies were administered before a trial was made of the Bath waters, but all without effect; but after bathing and pumping a fortnight, he was perfectly restored. The palsy in this case was of the general kind, and deprived the patient of the use of his limbs and speech almost entirely.

The Bath waters are likewise very efficacious in several paralytic affections, which are either the imperfect crisis of other disorders, or their immediate and natural consequence. Of this kind is the palsy† which

* Van Swieten observes, that country people sometimes become paralytic from sleeping, exposed to the sun; and quotes Hippocrates for a similar observation on the exposure of the head to the sun in hot weather. Van Swiet. Comm. vol. III. p. 361.

† Sauvage observes of this complaint, that it is exasperated by the saline mineral waters, but relieved by the sulphureous ones.

of the BATH WATERS.

which frequently succeeds the chronic rheumatism, which last itself seems nearly connected with a paralytic affection. Of these, twenty-two out of twenty-seven were cured or benefited in the Bath hospital by warm bathing, three were no better, one died, and one improper to be continued.

Palsy from
rheuma-
tism.

The external use of the Bath waters is likewise equally effectual in those paralytic complaints which succeed fits of the gout,* and which are nearly allied to the foregoing.

Palsy from
gout.

P The

* The good effects of the Bath waters in such cases is described by Dr. Musgrave:—

Quum vero finistri lateris quædam maneret imbecillitas, illius causâ Bathoniam meo hortatu, petens, thermas ingressus est; unde artuum qui defecerunt vires & robur pristinum redintegratum habuit, ex illoque tempore, subinde dolens articulis, annos ille permultos egit, *apoplexia* & omni capitis insultu liber, non nisi senio demum confectus. Musgrave, de arthritide anomala, p. 438.

Had this been written after Dr. Mead's *Monita et Præcepta Medica* were published, it would have appeared as if inserted to contradict his assertion concerning the bad effects of the warm bath in palsy.

Dr. Musgrave likewise relates another instance of the good effects of the Bath waters, externally used, in a palsy succeeding the gout, and attended with a bilious colic. p. 444.

Palsy from
colic.

The Bath waters likewise, used in this manner, afford great relief in those paralytic disorders that are consequent on bowel complaints, especially such as are contracted in hot countries, and generally accompanied with bilious symptoms, as the West-India colic, commonly called the dry belly-ach, violent bilious colics, &c.

Dr. Charlton relates two instances of this kind,* wherein bathing and pumping were of the utmost service, though under the most unpromising circumstances.

Palsy from
fevers.

Fevers likewise, when they go off without a due crisis, often produce much mischief to the constitution; and of these, palsies are no unfrequent consequence. In the cure of these the Bath waters, externally used, are very successful. Dr. Charlton relates three cases at length of such complaints, which were all perfectly cured by these means; and by the hospital register it appears, that out of seventeen patients affected in this manner, thirteen were

* By Dr. Baker's account it seems very probable that all these colics which produce palsy are caused by lead, and, consequently, that these might be referred to this head.

were cured or benefited, and only two received no relief.

The Bath waters have likewise sometimes been found of service in paralytic disorders arising from scrophula, which might, a priori, be reckoned amongst the most incurable of any, as it might be supposed it would scarce produce this effect, except the nerve itself was corroded by the acrimony of the scrophulous poison; yet by the hospital register it appears, that one out of two who were admitted under such circumstances received relief; but I imagine this may well be esteemed among the most doubtful cases, though still worthy of trial.

Palsy from
scrophula:

The baths at this place also are found extremely serviceable in those paralytic disorders which are caused by mineral poisons, of the metallic kind especially.

Palsy from
poison.

The principal of these is lead, whose effects on the human body have been lately accurately described, as well as the means by which it is most likely to gain admission into it, by Dr. Baker and Dr. Percival. One of the most dreadful consequences of this poison is palsy, of the

Lead:

hands especially, though not unfrequently the lower limbs are affected in like manner.

In these cases the bath generally proves successful,* except the disorder has been of long standing, and neglected; but even these discouragements ought not to make us despair of assistance in this species of palsy, since the bath will often give at least great relief, even in the most unpromising circumstances.

! Dr. Charleton relates two cases, in one of which the bath was not tried until one-and-twenty months after the seizure; and another, wherein seven months were elapsed after a second attack before the patient came to the bath; yet, notwithstanding, both of them perfectly recovered.

By the hospital accounts it appears, that out of forty patients admitted for the palsy from mineral effluvia, most, if not all,
of

* Sulphureous baths have been long celebrated in this species of palsy.

Sulphuratæ adhibeantur thermæ quarum centies exploratus constat effectus pluribus infans in cassum tentatis parestin quæ colico supervenerat dolori thermis Aquis-granensibus sanavit Forestus. *Tronchin*, cap. xxxi.

of which were caused by lead, thirty-eight were cured or benefited. But this catalogue is, in reality, much larger: for it appears by the same register, that 237 patients were admitted for palsies, from the cyder and bilious colics, which is only the palsy from lead * under a different name; and out of these, 218 were cured or benefited, only five received no benefit, and nine died.

This disorder shews an instance of the superiority of the Bath water, externally applied, to common water. In the London hospitals, where this disorder is extremely frequent, and where warm bathing is frequently used as a remedy, it is observed, that most of the cases admit of cure when the muscles that form the ball of the thumb retain their plumpness and size; but, as often happens in the advanced state of this disease, when those are greatly wasted, the case is almost always incurable by their remedies. But the Bath waters have been found frequently successful, even after the appearance of this symp-

P 3 tom,

* Vide Medical Transactions, vol. I. p. 334, 335, 336.

tom, in removing the paralytic affection; but, I believe, the muscles of the hand, which are wasted, scarce ever recover by any remedies.

Mercury.

The Bath waters thus applied are likewise very successful in those paralytic affections that succeed the taking a large quantity of mercury into the body, to which gilders, refiners, and others who work in this metal, and especially those who are exposed to its fumes, are subject.

Suppression of natural discharge.

Sudden suppression of natural discharges will sometimes give rise to this complaint. Dr. Charlton gives an account of a case of this kind, which was caused by menstrual obstruction, and was perfectly cured by bathing in the Bath water; the superiority of whose efficacy to common water was here very apparent.

In the hospital register two only are mentioned as being paralytic from this cause, both of whom were cured or benefited.

The same author has related the history of a case where the same effect was produced by the premature stoppage of the lochia.

lochia in a lying-in, which was greatly relieved by the warm bath at this place.

The stoppage of the hæmorrhoidal discharge likewise in those who have been subject to this evacuation will, as Hippocrates observes,* cause disorders of this kind. I have not, indeed, seen any instance of this kind at this place; but, from analogy, the safety and utility of the Bath waters may, with the greatest probability, be inferred.

A cause, directly opposite to that just mentioned, will sometimes produce the same effect, viz. *excessive evacuation*, of blood especially. Several of the palsies which happen to women in their lying-in arise from immoderate discharges by flooding, and in these the Bath waters are in general successful.

I have myself seen a very remarkable case which arose from a cause similar to the foregoing, viz. immoderate menstrual discharge, in which the Bath waters, thus used, were of the utmost service, and evidently

* Coacæ Prænotiones, No. 346.

dently recovered the patient from as deplorable a state of this kind as can well be imagined; and this after the most approved medicines commonly used in such circumstances had been tried without effect.

The efficacy of the Bath waters is likewise very great in those palsies that arise from external accidents. Dr. Charlton relates two remarkable cases of this kind, in the first of which the patient did not make trial of the waters until upwards of a year after the accident, and, notwithstanding, received great benefit. In this case the palsy arose from the origin of the nerves in general being affected by a blow on the cerebellum; in the latter case it was apparently owing to the compression of the spinal marrow, by the distortion of the third and fourth vertebræ of the neck. The last patient was not admitted until six months after the accident, at which time the vertebræ were still displaced, and his lower limbs paralytic. But by using the waters, in the way of pumping, the vertebræ regained their natural situation, the perfect use and feeling of his limbs returned, and all his complaints ceased.

It appears likewise, by the hospital register before quoted, that out of nineteen paralytic patients, from external accidents, who were admitted in the space of thirteen years, sixteen were cured or benefited, and one only died.

The dead palsy, as it is called from the loss of sensation accompanying that of motion, is generally accounted one of the worst * kinds; yet in this the Bath waters have been found remarkably successful.

Dr. Charlton relates two cases of this kind, both of which were perfectly cured: and by the hospital register, before quoted, it appears, that only three of this kind were admitted, all of which were cured or benefited.

In those palsies that are attended with tremor of the parts affected, and sometimes of the whole body, called shaking palsies, the

* Aliquando, licet rarius est, una cum motu, omnis sensus abolitus est & quidem malo omine. Van Swieten, §. 1057.

Cum autem dictum fuerit, quandoque una cum motu, & sensum omnino perire in parte paralytica, merito & hoc pro-malo omine habetur, quia causa paralyfis non tantum nervos moventes, sed & sentientes impedit, adeoque fati valida est. Van Swieten, §. 1062.

the Bath is less successful. Dr. Charlton observes, and I have made the same remark from my own observation, that unless they are the consequences of some acute disease, or of suppressed gout, they seldom receive any considerable benefit from the waters. By the hospital account, it appears, that out of five palsies of this kind, one only received any benefit.

I have likewise observed that the Bath waters, used as baths, are seldom successful when the paralytic parts are disposed to a large discharge by perspiration.* This has been observed by Boerhaave and others to be a bad sign, except it proves immediately critical by a relief of the symptoms. This disposition the Bath waters, and I suppose every warm bath likewise, are apt to increase, and therefore in such cases are justly forbidden.

The bath is likewise often unsuccessful in disorders of this kind in general, when
of

* Si sudores paralyfin non statim curent, eam fere semper incurabilem reddunt, & hoc in multis accidit. *Duretus.*

Diaphoresis non omnibus convenit & biliosis sæpe officit. *Willis,* speaking of the palsy.

of long standing, and therefore the sooner they are applied to after the attack, the greater are the hopes of relief.* But this is common to them with other remedies, and indeed less applicable to them, as they have frequently succeeded when the disorder has been of too long standing to be affected by other applications.

The Bath waters have likewise been found of the utmost service on account of this quality in the chlorosis, especially when attended with inertia, paleness, want of appetite, and muscular relaxation.— Many cases of this kind are given by some of the old writers, which, though very inaccurate, sufficiently prove the efficacy of these waters, externally used, as well as internally, in this complaint. Hippocrates † advises the frequent use of the warm bath, and of an aromatic fumigation at the same

In the
chlorosis.

* And I must also observe, that the length of time in which the patient hath laboured under the complaint (as in every other species of palsy) proportionably retards the cure; for I am persuaded that these waters would prove more effectual than they often do, were they applied to as soon as possible after the attack. Charlton's inquiry, p. 40, speaking of the hemiplegia.

† De superfætatione, §. xxiv.

same time; and Van Swieten * advises a medicated bath of aromatic herbs to increase the stimulant and corroborating quality of it, and expressly with an intention that the active ingredients might be absorbed into the course of circulation. In order to guard against its relaxing qualities, he directs friction to be used with it.

The Bath waters fulfil all these intentions incomparably well, being more stimulant than common water, and at the same time free from the nauseous smell of the ingredients commonly used on such occasions.† I shall only observe farther, that it is best adapted to that species of this disorder

* Comm. §. 75.

† Dr. Sydenham's advice will have no small weight in this place:—"Sed ut hoc sit, si ob contumaciam ejus hic adfectus ferreis aquis minus cedat, adeundæ sunt aquæ calidæ sulphuræ, quales sunt nostræ Bathonienses; atque æger postquam tribus auroris continuis eas intus adsumserit, sequenti die balneum ingrediatur, & postero die iterum eas bibat; idem faciendo alternatim per duos menses integros. Etenim tam in his quam in aliis cujuscumque demum generis sint, hoc sedulò notandum, quod in earum usu eousque ægro persistendum, donec non tantum levamen aliquale sentiat sed quominus symptomata omnia brevi postliminio revertant, donec omnino convalescat. Sydenham. *Diff. Epistolar.*—*de chlorosi loquens.*

'Tis great pity that the latter part of the excellent advice here delivered was not more generally attended to in all complaints for which these waters are advised.

order which is attended with a suppression or diminution of the menstrual discharge.

On the same account the warm baths are of the greatest service in cachectic disorders, which in many respects resemble the foregoing. This disorder at its beginning is almost always attended with a slow pulse, and diminution of natural heat and strength, and on these accounts I think the baths here, as being more stimulant, preferable to common water.

In cachexy.

Hoffman, who was a great friend to the use of the warm bath in this complaint, has here directed a medicated bath prepared from aromatic herbs, evidently to increase its stimulus, and further the same intention of cure with which the Bath waters are recommended.

The good effects of the Bath waters in the jaundice, both internally taken and externally applied, have been long observed. This disorder, as well as the foregoing, is attended with symptoms that indicate the use of stimulant medicines, and in this respect the Bath waters seem to have a degree of specific action upon the nerves, and perhaps on the bile itself, removing that torpor,

In the jaundice.

torpor, insensibility, and languor, which accompany this complaint, sooner than any other medicines known. Cælius Aurelianus * advises the use of stimulant substances, and such as cause an itching of the skin, to be rubbed or sprinkled on the body after bathing; and directs the water to be made hotter than usual, to render the stimulus the greater. This seems to bear some analogy to the intention with which the baths of this place are recommended.†

In the hypochondriasis.

The hypochondriac disease is likewise greatly relieved by the use of the baths at this place; and, I imagine, in a great degree owing to their stimulus. But as this complaint is of the spasmodic kind, the effects of the waters in it will be more properly treated of under the head of their antispasmodic qualities.

In sterility.

The effects of the Bath waters thus applied in cases of sterility, are too well known to be necessary to be repeated. I shall only observe, that they are most efficacious

* De ictero.

† Celsus evidently advises the warm bath as a stimulating cordial remedy in this disease.

cacious in cases where the want of issue is owing to weakness and languor, and where no feverish or hectic symptoms are to be apprehended.

The effects of the Bath waters thus employed are much more extensive as antispasmodic remedies.

Bath waters, externally applied, as antispasmodic.

One of the most remarkable instances of their efficacy in this way is the colic pictonum, in which complaint their use has been long celebrated. Notwithstanding the various causes that have been assigned for this complaint, I am inclined to believe, with Dr. Baker, that it always proceeds from lead, and from that only. The colic is the previous symptom to the palsy, which always succeeds, first of the hands, and then of the lower extremities, if the disease be suffered to proceed. The ingenious writer, last mentioned, has related in his account of this disorder, that the Bath water has frequently succeeded when the other most approved remedies had failed in the advanced state of this complaint. But at the beginning the Bath waters, internally and externally used, prove a speedy and almost certain cure. The use
of

In the colic pictonum.

of the warm bath, and of sulphureous waters especially, has been much recommended in this disorder. Even Dr. Mead,* who was so great an enemy to the use of the warm bath in palsy, admits its superior efficacy in this disorder, which is certainly nearly connected with it. Sulphureous waters are likewise advised by Sauvage, both hot and cold, and the former externally as well as internally. Tronchin likewise, the celebrated author of the treatise on this disorder, has advised their use in the strongest terms, as the most effectual remedies in this complaint.†

Hysteric
colic.

The hysteric colic likewise has been greatly relieved by the external use of the Bath waters, and probably owing to this quality.

Asthma.

Asthmatic disorders likewise, of the convulsive kind, have been greatly relieved by bathing

* Longè autem plus juvat balneo tepido corpus totum immergere. *Mead. monita & precepta medica.*

† Curationem absolvent sulphure divites thermæ omni medicaminè præstantiores. *Tronchin, cap. xxvii.*

Vide also Forestus on the effects of the Aix-la-Chapelle waters in this disorder. *Observ. ac curat. medic. lib. 21, obs. 15.*

bathing in these waters. They seem particularly suited to those species which affect hypochondriacal or hysterical constitutions, and are exasperated by the retention of some accustomed discharge, as by the menses, hæmorrhoidal vessels, &c.

The Bath waters thus used are also extremely well adapted to the asthma, which often succeeds fits of the gout that have been repelled from the extremities, and partakes greatly, as Sauvage observes, of the nature of the convulsive or spasmodic asthma.*

They are likewise extremely efficacious in the cure of the asthma from metallic substances, *lead* especially, which is indeed only a symptom of the metallic colic, of which I have before spoken.

I have before mentioned the Bath waters as serviceable in icterical complaints, by their stimulus, as thereby relieving the inertia and languor, which are symptoms of this disorder. But the Bath waters are
Q of

In jaundice.

* Sauvage advises the use of sulphureous baths in this species of asthma.

of much more consequence considered in another light, viz. as antispasmodic remedies. The jaundice most frequently proceeds from obstruction of the gall ducts by biliary calculi, and sometimes, though more rarely, to a spasmodic constriction of those passages. The antispasmodic qualities of the Bath waters are of the utmost service, which soever of these causes produce the disease. In the first, by their relaxing quality, they enlarge the diameter of the duct, and procure an easy passage for the biliary concretions; and in the last, by their antispasmodic power, they take off the contraction; in both cases opening a passage for the bile by its proper exit, and thus curing the disorder.

Sauvage was so sensible of the utility of the warm bath in this disorder, that he not only directs it to be used repeatedly, but likewise directs * the purgative medicines to be taken by the patient whilst in the bath, in order that the biliary calculi may pass while he remains in it. But the Bath
waters

* *Æger in ipso balneo catharticum bibat ut calculus in ipso balneo foras eliminetur. Sauv. nosol. meth. genus, hepatalgia.*

waters are in this respect preferable * to a bath of common water, as being more antispasmodic, and possessing at the same time a gentle stimulus, which I have before mentioned, as so conducive to relieve the symptoms of this complaint.

Menstrual obstructions likewise, when proceeding from spasm, as frequently is the case when they are brought on by some sudden and evident cause, as affections of the mind, cold, &c. receive the greatest benefit from the external use of the Bath waters, as I have more than once experienced.

Menstrual
Obstruc-
tions.

The well-known effects of bathing in the Bath waters in preventing miscarriage, are, I think, very probably owing to this quality. They seem to succeed best when this misfortune is likely to arise from an over sensibility of the nervous system, and at particular periods of pregnancy, as is frequently the case in delicate habits and constitutions.

Prevent-
ing abor-
tion.

The Bath waters likewise are of the utmost service in several disorders which

Nervous
diseases.

Q 2 are

* Baccius advises temperately warm baths of sulphureous waters in this disorder. De Thermis, p. 112.

Indications of the EXTERNAL USE

are more obviously of the nervous or spasmodic kind, than those just mentioned.

Of this kind are epileptic complaints, St. Vitus' dance, and the hysteric disease,* and other anomalous spasmodic affections. Dr. Charlton mentions in St. Vitus' dance, that six out of eight patients in the hospital were cured or greatly relieved; and that of others who laboured under various other anomalous nervous affections, out of 146, 113 were either cured or greatly relieved, eighteen were no better, five died, seven were improper, and three discharged at their own request. It is obvious how favourable this account is to the good effects of the Bath waters in disorders of this kind, and proves beyond a doubt that the opinion of some of the modern practitioners, as to the bad effects or inefficacy of the Bath waters in such diseases, was ill founded. I shall only observe further, that their good effects here are consonant to what might be expected from their sensible qualities, and the analogy of their known
success

* Of each of these I have myself seen several instances.

success in other disorders of the spasmodic kind.*

Nearly connected with the foregoing is the hypochondriac disease, for the relief of which the Bath waters have been long celebrated. Of late years bathing has been but little advised in this disorder, and the internal use of the waters has been chiefly depended on. But it appears from the ancient accounts that these waters were celebrated for the cure of this disorder, at a time when drinking the waters was scarce ever advised, and the whole stress laid on their external use. Sulphureous baths are advised for this disorder by many of the most celebrated physicians, both ancient and modern. Hoffman, indeed, prefers a bath of simple water to any mineral one; but his sentiments on this subject were evidently deduced more from a theory concerning the cause of the disorder than actual experience. He himself allows the great utility of sulphureous baths in this

Hypo-
chondriac
disease.

Q 3. complaint,

* A particular case of the spasmodic sort, very extraordinary in its kind, is related by Dr. Charlton, wherein the external application of the Bath water effected a complete cure when the most efficacious internal remedies had not the least good effect. Vide his Inquiry, p. 53.

complaint,* notwithstanding his being an enemy to the use of the saline mineral waters; but attributes it to nothing more than the greater heat of one of the baths at Toplitz, of the sulphureous kind, whose good effects he instances on this occasion. But just after, he advises a tepid bath only, in such cases, as preferable to a hotter one; and evidently speaks of an artificial bath, as a substitute only when the natural ones cannot be had.†

Aretæus, whose judgment and accuracy of observation are remarkable, advises a sulphureous bath on such occasions, and expressly with an intention to restore the flesh and strength of the patient; which shews how different the opinion of this great writer, concerning the effects of this remedy,

* Utilissimum autem est hypochondriacis balneum Tœplicense sulphuratum, *das Schwefel bad*, non aliam ob rationem quam quod majori caloris temperie gaudeat quam illud quod in urbe est.

† Si vero non est copia hujus balnei quod a sulphure nomen habet, utendum est eo quod intra urbem est ut in labro ligneo ovali circulo fabricato intra conclave balneo quis utatur; *ita enim temperationi reddito calore, major utilitas in hoc affectu expectanda est.*—Hic vero notandum, quod, si thermæ naturales haberi nequeant harum loco commodissime balneum ex subtili & levi aqua plurali præsertim post cadentes imbres excepta substitui possit. *Hoffman, de balnear. aquæ dul. usu.*

medy, was from some modern practitioners, who are afraid of using it, lest it should produce the very complaints which he employs it to remove.*

I have likewise seen bathing in the Bath waters of the greatest service in the nervous head-ach, especially that kind called the hemicrania, where half the head only is affected. Two cases of this kind have fallen under my observation, in both of which the return of the complaint was periodical, one of them returning at an interval of about ten days, but rather irregular, the other nearly regular at the end of fourteen days. In both of these, the most celebrated antispasmodic medicines had been previously tried, as musk, opium, and volatile salts, but

Nervous
head-ach.

* Cæterum ab his laboribus ad refectionem veniendum est: in quibusdam enim procedente curatione morbus quidem de sede suâ labefactatus est. Verum ubi homo ad carnem viresque jam instaurandas pervenit, mali omnia simul oblitterata sunt vestigia, siquidem naturæ robur sanitatem, imbecillitas autem morbos facit. Ad refectionem itaque se convertat æger, in naturalibus aquis calidis sæpe commorans: etenim ea quæ his insunt medicamenta juvant, ut bitumen, aut sulphur, aut alumen, quæque in iis reperiuntur aliæ plurimæ facultates; siquidem humiditas post morbi ariditatem & medellæ vexationem convenit, raræ vero mollesque carnes ad morbi depulsionem maxime conducunt, verum istæ in melancholicis aridæ sunt & densæ. *Arctæque curatio melancholiæ.*

but without any great present relief, and without the least effect in preventing or retarding the return of the paroxysm. Peruvian bark likewise was administered in large quantity, under the notion of the disorder's being of the nature of an intermittent fever, but without effect. Indeed the pulse at this time was low, and rather slower than ordinary, and the vital heat, especially in the extremities, diminished. A course of warm bathing at this place totally cured both these complaints, altho' in one of them the warm bath of common water had been tried with very little relief.

Spasmodic vomiting.

There is likewise a disorder to which the fair sex are most liable, viz. a spontaneous violent rejection of the food from the stomach without any previous sickness, which comes on at various times after eating, sometimes almost immediately, and at others at the distance of one, two, three, and four hours. This complaint is generally periodical in the same person, and appears evidently to be of the spasmodic or convulsive kind. In this I have several times seen the external as well as the internal use of the Bath waters of the greatest service,

service, and in general to work a perfect cure.

The nervous atrophy likewise is probably a disorder of the spasmodic kind, which affects the lacteal and lymphatic system. In this I can say from experience, as well as the testimony of others, that warm bathing in these waters is often of the greatest service. A great presumption of their good effects in this disorder may be drawn from the well-known fact, that the women who attend the bath as guides to the bathers, and remain several hours in a day in the water, and this most days in the week for a great part of the year, are in general remarkably lusty and corpulent, notwithstanding the large evacuation they daily undergo by perspiration. This coincides with the observation before quoted from Prosper Alpinus,* and confirms the hypothesis of the effect of the warm bath in increasing the absorption of the nutritive parts of our food.

Nervous
atrophy.

Rigidity of the limbs, owing to contractions of the muscles, (which is undoubtedly

Muscular
contrac-
tions.

* Page 45.

doubtedly a spasmodic complaint, though not of the nature of those commonly accounted so) is generally greatly relieved by the external use of the Bath waters. They are advised in almost all the species of this disorder; but there are, notwithstanding, some to which they are more peculiarly adapted. Thus they are of the utmost service in those contractions of the muscles of the extremities, which are often attended with contortion of the limb or joint, and follow fits of the gout or rheumatism. These are sometimes attended with considerable pain, but more commonly with a degree of stupor and weakness of the part. In both these cases the baths at this place are very successful, and in constant use.

Sauvage, in his account of this complaint, recommends the use of native sulphureous warm baths,* as those of St. Laurent, Lamalou, and Bagnau, which are of that kind.

I am likewise greatly inclined to believe that they might be very successful, thus applied.

* Hæc species (contractura dolorifica) exigit fons ex aquis thermalibus sulphureis, ut Lamalou juxta Biterras; St. Laurent apud Helvios, et Bagnau juxta Mimatem. *Sauvage* genus contractura.

applied, in those violent contractions of the limbs, and sometimes of the muscles of the whole body, and which are attended sometimes with pain and swelling of the joints, and are the consequence of a high degree of scurvy. These remain sometimes a long time after the other symptoms have ceased, and are very troublesome. For these Dr. Lind advises a course of diaphoretic remedies ; but at the same time takes notice of the great service that was done by the use of moderately stimulating external applications, applied in the way of fomentation.*

Now I should imagine the Bath waters would fulfil both of these intentions, viz. of increasing the diaphoretic secretion, and stimulating the part moderately at the same time, and on that account be more likely to succeed than when either of them separately were pursued.

Paralytic contractions of the extremities, the upper especially, as the hands, fingers, &c. sometimes follow violent fits of the rheumatism, and are generally esteemed
very

* Treatise on the Scurvy, p. 212.

very difficult to cure, if not quite incurable * Yet this complaint, it is well known, generally yields, without any remarkable difficulty, to the external use of these waters. Of this kind, I believe, are those contractions which are caused by wounds, falls, and other external accidents; the success of the Bath waters in which has been remarked from great antiquity. The Aix-la-Chapelle waters,† which in a great measure resemble those of Bath, were found of the greatest service to the military, who received wounds in the wars in Germany and Flanders, and were, in consequence thereof, afflicted with this complaint.

Of a similar nature to the foregoing are those muscular contractions that are the consequences of the colic of Poitiers.

In this complaint the muscles of the upper and lower extremities are often contracted in such a manner as to feel of an almost stony hardness, especially the calves of the legs, and thighs. Lead is, I be-

* Sauvage speaks of this species as incurable. Vide his remark on it. *Contractura paralytica*.

† Vide Dr. Williams on the Aix-la-Chapelle waters, p. 116, 117, 118, and cases xviii. xxi.

lieve, always the foundation of this disorder, which indeed is only a symptom of the colic of Poidiers; of the good effects of warm bathing in which I have before spoken.

I shall only observe here, that the disease which appears in Austria, described by Van Swieten * and Mr. Sauvage, and called by the latter *Contractura Bohemica*, and by them ascribed to the drinking of wine made of austere and unripe grapes, may, with much greater probability, be imputed to the effects of the last-mentioned metal.

Sauvage mentions warm sulphureous baths as the principal remedies in this disease, as well as that which he holds to be more immediately produced by lead.

In the former part of this work I have attributed the good effect of the warm bath in fevers principally to its antispasmodic quality. As I have represented the Bath waters as possessing this in a higher degree than common water, it might perhaps be

Bath waters, if proper in fevers.

hence inferred that I advised their use as baths, preferably to those of simple water, in such disorders. But this is what I by no means desire to be understood to mean, and on this head I beg leave to offer a few words on the subject of spasmodic disorders in general.—

An increased irritability, which is the general cause of the disorders called by this name, may be produced by different and even opposite means. Thus inflammatory fevers, in which the *vis vitæ* is præternaturally increased, are often attended with great irritability, and in this case those applications which diminish the vital powers, as bleeding and other evacuations, prove antispasmodic. On the other hand, a great diminution of the strength and tone of the system will produce the same effect, viz. a morbid degree of irritability, to remove which, cordial and stimulating remedies are indicated, and evacuations are hurtful. Fevers indeed sometimes require medicines of the kind last mentioned. But this is generally in their advanced state, when the inflammatory diathesis has ceased, or is greatly abated, and the vital powers are much depressed.

At

At this period the irritability and disposition to spasm which remains, is frequently owing in a great measure to weakness. But although the indication be of this kind, it is well known that all the medicines commonly used with such intention are not equally proper, but that, on the contrary, great delicacy in their choice is necessary. The head is at that time for the most part affected with a degree of delirium, which renders great caution in the use of stimulating remedies very necessary. In relieving this last symptom, the warm bath has generally the most happy effects, being, as has been before observed, mildly cordial without inflaming, gently filling the blood vessels without loading the stomach, and, what is perhaps its most valuable quality, inducing a pleasing sensation on the nervous system without the inflammatory qualities of opiates, &c. and at the same time entirely under our command, as to the continuation of its effects on the body. But I am greatly inclined to believe, that the above account of the good effects of this remedy in such circumstances would not be applicable to the Bath waters, which, as I have before mentioned,

act,

act, not only by their general qualities as warm baths, but also by their specific ones derived from the nature of their composition. What leads me to be of this opinion is, that the Bath waters are not only more stimulant than common water, but that their stimulus is more permanent, and (to those who have any disposition to feverish complaints) of an inflammatory kind. This is obvious from their effects internally taken in the hectic fever, in pthises, and several other disorders; and it appears highly probable, that the water exerts the same effects externally applied, not only from reasoning drawn from its being absorbed, and thus acting on the system by its peculiar qualities, but also from fact: for instance, its superior efficacy in palsies and such complaints to common water, in which an inflammatory stimulus is of the greatest service. But the Bath waters are not only more inflammatory than common water, but also particularly affect the head, as is well known to most of those who use them internally, especially at their first trial, which is an additional reason against their use in such circumstances. I have made choice of the
above

above state of a fever, as being one where the Bath waters might have the fairest chance of success, the indication being, in some degree, of that kind. But if their use be improper here, it follows more strongly that they would be so in other states of it, wherein the inflammatory disposition was more prevalent, and consequently their stimulant qualities likely to be more dangerous.

What has been said concerning the effect of the Bath waters in fevers, is applicable to them likewise when attended with any local inflammation, as of the bowels, stomach, or any other of the viscera, or parts immediately necessary to life, the brain particularly, as in phrenetic disorders, their use in which I apprehend would be extremely dangerous.

In local
inflammations.

Two complaints are exceptions to this rule, viz. the gout and rheumatism; but even in these the Bath waters are scarce ever advised externally while any considerable inflammation remains; and the exciting an inflammation in a moderate degree seems in the former to be only following the intention of nature, which takes this

R

method

method to discharge the gouty matter; and in the latter as often useful in obviating that inertia which I have before mentioned to be of the paralytic kind, which fits of the rheumatism often leave behind. But of the use of the Bath waters in these complaints, I shall speak more particularly in another place.

But though I do not think the Bath waters safe or proper to be used externally in continued fevers, I am inclined to think, both from reason and experience, that they may be of great service in intermittents.

The use of the common warm bath in these disorders has been before spoken of; and the Bath waters answer the same intentions in a more efficacious manner, as possessing greater stimulating and corroborant powers, and consequently more likely to prevent the return of the paroxysms, whose recurrence is probably owing to, or at least nearly connected with weakness and want of tone of the system. The warm bath was employed*

in

* Vide p. 46 of this volume.

in this disorder, either in the interval, or immediately on its access; but I would prefer the former, when the Bath waters are used, on account of their superior stimulus, which might rather tend to increase the fever if used after the fit had begun. But the nearer the time of its access, the more likely to be efficacious, (as is observed of all the remedies for this disorder) provided the paroxysm had not made its appearance. I would especially recommend this remedy in those intermittents which are of long standing, and attended with obstructions in some of the viscera, the liver particularly, which often succeed this complaint, and are often sensible to the touch by a hardness under the ribs on the right side of the fore part of the abdomen, which is called by the common people the ague cake.

I shall next treat of those complaints wherein the Bath waters are serviceable by means of their diaphoretic qualities.

These seem to be the foundation of the use of the waters in rheumatic complaints, in which they have been so much celebrated.

Bath waters externally applied as diaphoretics.

In rheumatism.

Indications of the EXTERNAL USE

As I have before declared it to be my opinion, that the Bath waters thus used are less powerful than common water in promoting perspiration, it might be imagined that I thought them to be less efficacious in this disorder ; but this requires some explanation.

In the acute rheumatism, such as is described by Sydenham, which is attended with a considerable degree of fever, great pain, and other signs of an inflammatory disposition,* the common warm bath is preferable to the Bath waters, for the reasons before given ; and even this should be used with great caution. But there are many species of this disease, where the inflammatory disposition is very slight ; yet the pain and other symptoms very grievous, and of long duration.

Of this kind is that species which is most frequent, and well known by the name of the common rheumatism. In this the Bath waters are singularly serviceable, especially towards the decline of the paroxysm,

* Hæc species est verè inflammatoria. *Sauvage. Rheumatismus acutus.*

paroxysm, when other stimulant remedies likewise are observed to be of use; and from this combination of effects in these baths, I imagine, arises their superior efficacy. Sulphureous baths are, I see, recommended by Mr. Sauvage in one species, (*rheumatismus calidus*) which does not appear to differ essentially from the common one.

The Bath waters thus applied are likewise of the utmost efficacy in those rheumatic pains which sometimes accompany the colica pictonum, and are generally extremely violent. The reason of the superior efficacy of the Bath waters here will easily be understood from what has been before said of their use in the original disorder, especially when we consider that this complaint is attended with a degree of palsy of the parts affected.*

Under this head I have chosen to place the gout; though, undoubtedly, the diaphoretic quality of the baths at this place is not the only one by which they prove

R 3

serviceable,

In the
gout.

* Incipit illa species a manuum & brachiorum stupore formicatione digitorum contractione.

Sauvage. *Rheumatismus metallicus.*

serviceable in this disorder. I believe it may be said, with the greatest probability, that warm bathing in these waters is useful in every variety (for I think the best writers allow but one species) of this complaint. Notwithstanding there are undoubtedly some to which they are more peculiarly suited,

Thus they are well suited to that called by Mr. Sauvage the winter gout,* which is indeed the most common of any. It generally comes on in the decline of life, and does not keep regular periods, but recurs throughout the whole year, excepting the three summer months. This is the kind of gout so incomparably described by Sydenham, under the title of the irregular gout, under which he himself seems to have laboured. Moderately warm diaphoretic remedies are found to succeed best in such cases, by the testimony of the best practitioners.† Sydenham, indeed, objects against attempting to carry off the gouty matter by perspiration, as well as by the
other

* *Arthritis hyemalis.*

† In illa conveniunt magis sudorifica. *Sauvage.*
Sudorifera ex arte instituta plus proficere. *Boerhaave,*
aph. 1272.

other modes of evacuation ; but I am well satisfied he meant here only to except against the means of promoting that discharge which were in use at his time, (such as great heat by fires and bed cloaths, and heating stimulant medicines) and not to find fault with a moderate and mild diaphoretic regimen. This is evident from the substances which he advises, such as horse-radish, scurvy-grass, theriaca, &c. which are all of this tendency. Had this excellent and candid writer been sufficiently acquainted with the virtues of the Bath waters, both internally and externally used in this complaint, I doubt not he would have recommended them prior to all other remedies, as fulfilling the intentions of cure in a more speedy, safe, and efficacious manner.

In the regular gout, the proper time for bathing is generally held to be in the intervals of the paroxysms ; but in this, less caution of that kind is necessary, and bathing may be used with safety and propriety as soon as the inflammation has abated, and the fit continued for a longer time than the regular paroxysm. It is observable, that this kind of gout is attended

tended with much less inflammation and fever than a regular one.

The bath waters are also extremely serviceable when used in this manner in the rheumatic gout,* which is indeed of a middle nature between the two disorders. This seems much to resemble the third sort of gout, described by Dr. Oliver in his Essay † on the use and abuse of warm bathing in gouty cases, in which he advises the free use of the waters in all their modes of external application.

Sauvage likewise advises the use of warm sulphureous baths, such as those of Barèges, Lamalou, Rennes juxta Aleth, &c.

The Bath waters are likewise of the utmost service in the gouty complaints that sometimes follow the colic of Poictiers, which have been observed and described by Dr. Musgrave, and since his time by Dr. Huxham. The use of the Bath waters

* Rheumatismus arthriticus. *Sauvage.*

Ille est qui & articulos & passim partes carneas afficit ita constanter ut ad rheumatismum & arthritidem fere æqualiter inclinet. *Sauvage. Descriptio rheumatismi arthritici.*

ters in the original disorder, from which this is derived, is an additional reason for our judgment in their favour in the present instance.*

Gouty complaints, when complicated with other disorders, often receive the greatest benefit from bathing in these waters. Of this kind is the combination of the gout, with the chlorosis mentioned by Musgrave,† which generally attacks those females who have an hereditary claim to the disease, and labour under a suppression of the natural discharges, which probably is the reason of its being thus prematurely brought on. The propriety of the use of the Bath waters in this manner is very evident, from their being so well suited to the original disorder, and particularly to the removal of that circumstance on which the gouty complaint probably depends.

Another combination of the gout, which is far from uncommon, is with an hypochondriac

* Huxham, I think, advises the Bath waters here externally used.

Aquæ thermales sulphurea suadentur. *Sauvage.*

† Arthritis ex chlorosi vel arthritis alba Musgravii.

chondriac constitution. In this the Bath waters are singularly serviceable, both internally and externally administered. Their use in both these complaints may furnish a rational presumption of the propriety of their trial in circumstances when they are conjoined; and this is confirmed by full and repeated experience. Dr. Musgrave* passes the highest encomiums on their use in this kind of gout, which he seems to ascribe to their diuretic quality; though I should be rather inclined to impute it to their stimulant or antispasmodic one.

I am likewise inclined to think the Bath waters, externally applied, likely to prove very serviceable in the scorbutic gout, as it is called, when conjoined with a considerable degree of the scurvy, as sometimes happens. Dr. Musgrave, † who has described this disorder the most accurately of any

* Sed nec aquarum diureticarum vim (quales sunt Bathonienses, Astropenses, Bamptonenses, aliæque permultæ) adversus hunc affectum, satis prædicare valeo; vel uti decet, laudem illis deferre. Coctionem illæ conciliant, digestionem illæ confirmant: Illæ sanguinem expurgant: Illæ spiritus permulcent: Illæ melancholicis, & hysteris, solatio: Illæ arthriticis incolumitati. *Musgrave, de arthritide melancholica.*

† Externè vero balneo, fotu, illorum ferociam temperanti. *Musgrave, de arthritide fixa scorbutica.*

any person, recommends in it the warm bath, and fomentations, to moderate (as he says) the acrimony of the humours. Whether the good effects of this remedy were produced by that means, I shall not determine; but only observe, that the good consequences of its use in the scurvy are well known as a fact, and that there is the greatest probability, from reason as well as experience, of its good effect in the disorders when united,

Bathing in the Bath waters is here peculiarly serviceable, and, in my opinion, superior much in efficacy to common water, as being less relaxing, and not so liable to promote a putrid tendency, and at the same time gently diaphoretic and diuretic, which are the most favourable means of any of evacuation in this disease.

The same caution, however, is requisite, as has been before observed of the use of the warm bath in the scurvy, viz. not to employ it if the putrid disposition should be so strong as to form external ulcers.

I should likewise imagine the Bath waters used thus, likely to be of great service

vice in that kind of gout which sometimes succeeds a venereal complaint, as described by Dr. Musgrave. That excellent author has advised the Bath waters internally, and I think their external use promises to be at least equally advantageous, on account of the efficacy of the warm bath in eradicating the remains of the distemper that gave rise to it, as well as useful in the gout, considered as a simple disorder.

Such are the principal cases of the gout, wherein the Bath waters, used as baths, appear to be peculiarly indicated. I do not mean to deny that they may be of the utmost service in several more; but the above I take to be the principal, and to which nearly all the cases of the gout, that are likely to receive benefit from the use of the waters, are in some degree reducible. To specify these particularly, would exceed the limits of a work of this kind. I take the opportunity of mentioning here, that this disorder is not strictly ranged under the indication, as there is no doubt that the stimulant and antispasmodic qualities of the Bath waters are of great efficacy in the relief of this disorder, as well as their diaphoretic ones; but as
the

the warm baths are used in the decline of the distemper, and the method by which they seem to act in evacuating the gouty matter being by perspiration, I thought it better to class it here as operating by a sensible effect, than under others which are more theoretical or uncertain.

The same quality of the Bath waters renders them a probable remedy in the scurvy, for which I should think them better adapted than simple water, on account of their having a moderately stimulant and antispasmodic quality, joined with their diaphoretic one.* Sauvage† and Dr. Lind ‡ both advise a bath of infusions of aromatic plants, to promote a similar intention. The same cautions as to its use are full as necessary as when simple water is employed.§

In the
scurvy.

It has been a matter of dispute, if the use of the Bath waters externally was admissible

In the
lues vene-
rea.

* Boerhaave and Hoffman both attribute the good effect of the remedies uted for this disorder to their diaphoretic qualities.

† Curatio scorbuti. Nosolog. Method.

‡ P. 200. Treatise on the Scurvy.

§ Vide p. 59.

missible in the venereal disease. This question has been very judiciously treated by Dr. Oliver, senior, of this place, who gives the best testimony of their being highly serviceable and safe in this distemper, both from the accounts of other writers, and his own experience.

In the
colic.

The Bath waters, by this quality among others, are of the greatest service in many colicky complaints, especially those which are induced by change from a hot to a cold climate, which are generally of the chronic kind, and often attended with spasmodic symptoms, and not infrequently with a bilious appearance on the skin. The gentle stimulus they possess, is here peculiarly serviceable in obviating that inertia which is so frequent in disorders of a bilious tendency, while the diaphoretic one tends to restore that discharge whose suppression gave rise to the disorder.

On account of the former of these effects, they are much preferable to common water.

In habitu-
al diar-
rhœa.

The warm baths of this place are likewise extremely useful in those habitual diarrhœas which arise from a check of perspiration,

perspiration, and are frequently the consequence of a change of climate of the kind last mentioned.

Probably to the same cause is owing in a great measure the efficacy of the waters in the diabetes ; though, undoubtedly, their stimulant and corroborating qualities are likewise of considerable service.

In the diabetes.

Whether the peculiar efficacy of these waters externally applied in the leprosy, be owing to this quality, is not quite clear. The fact, however, is well ascertained by long experience, both ancient and modern ; the former especially, when the leprosy was much more frequent than at present. The disorder called the *lepra Græcorum* is, I believe, what we now call the leprosy in this country ; and in this the external use of the Bath waters has been long celebrated. I should think likewise, that they might be of great service in another disease of a similar kind, rare indeed in this country, but not without instances of its being seen, I mean the *elephantiasis*,* or *lepra Arabum*.

In the leprosy.

* The *elephantiasis* of Aretæus, Dr. Cullen, and Sauvage, not the *elephantiasis* of Rhazes described by Dr. Hillary

Aretæus has recommended the use of the natural warm sulphureous baths*; and sulphureous applications externally, are advised by Cælius Aurelianus.†

Dr. Hillary likewise seems to approve of the use of sulphureous medicines in this disease, which is sometimes endemic in the West-India islands.

In the
apthoides
chronica.

I must not here omit to mention a disease wherein the Bath waters are recommended by the author last named, and which he only, I believe, has described: This disease he calls by the name of *apthoides chronica*, or *impetigo primarum viarum*, the former of which names may, I think, be very properly adopted. This disorder begins with a slight burning sensation about the pit of the stomach, which gradually increases, and rises up into the mouth, when small clear pustules, filled with acrid pellucid lymph, rise first on
the

lary in his account of the diseases of the West-India Islands, which is a quite different disorder, and not at all adapted to the same remedies.

* Balnea naturaliter calida sulphurea profunt. *Aretæus curat. elephantiasis.*

† De Elephantiasi.

the end and sides of the tongue, and spread over the mouth and downwards thro' the œsophagus, and sometimes thro' the whole alimentary canal. These pustules break, and the parts become raw and extremely sore. In some a spitting comes on, and in others a vomiting, and afterwards a diarrhæa, which gives some present relief; but the disorder generally returns with aggravated symptoms, and the patient, for want of ability to take in sufficient nourishment on account of the pain it gives, and of power in the intestines, on account of their increased sensibility, to retain it a sufficient time to have the nutritive parts absorbed, dies of an atrophy or marasmus. No fever, heat, or thirst, attend this complaint, but the perspiration* is diminished. The restoring the last-mentioned evacuation is made one of the first and principal indications by the above-mentioned excellent practitioner; and to accomplish this most effectually, he recommends warm bathing in some of the natural warm baths above all other remedies,

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* For a more particular account of this distemper, vide Dr. Hillary's *Observations on the diseases peculiar to the West-India Islands*, p. 277, & postea.

dies, and what has succeeded when all others have failed. Those of the sulphureous kind, Bath waters especially, he principally advises, and mentions several remarkable cures which were accomplished by using them as baths.

He endeavoured to imitate them by an artificial sulphureous and chalybeate impregnation, but with great candour owns, that his success was not equal to those who used the native sulphureous waters. He makes here a curious observation, that those who bathe in the native warm baths are not so subject to take cold after bathing as those who bathe in an artificial bath. Whether this be owing to any astringent or stimulant quality in the native springs, which closes the pores of the skin more than common water, or to the equability of their heat, which is not constantly decreasing, as it is in the artificial hot baths, I shall not determine. Either way, as a fact, it is a powerful argument in favour of the natural ones, in preference to their artificial imitations.

Bath waters as diuretic.

The diuretic effects of the Bath waters used in this way, though less considerable, are still worthy notice.

Hepatic

Hepatic obstructions, commonly called liver complaints, have been long observed to be greatly relieved by the use of these waters. As the diuretic quality they possess, which is well known to be a very favourable circumstance in these disorders, is in them in a considerably greater degree than in common water, it is not at all improbable, that their superior efficacy may in some measure be owing to this cause.

In liver
com-
plaints.

The like may be said of eruptions on the skin, such as are usually called scorbutic, the leprosy, and other cutaneous affections, in which this discharge is much indicated, and the Bath waters peculiarly effectual.

In cutane-
ous disor-
ders.

By the same means Bath waters, used externally, are of the greatest service in calculous disorders. But I would not here be understood to mean those where any large calculus is already formed, but such only wherein there seems to be a disposition in the constitution to generate fabulous matter, and where no considerable concretion of it has taken place. This seems often to happen towards the decline of life, from the slowness of the urinary

In the
calculus.

secretion, which causes it to remain a long time in the bladder before sufficient be accumulated to urge it to be discharged. In such cases, and indeed in all others of this kind, where diuretic remedies are admissible, the Bath waters are of the utmost advantage, both externally and internally used; diluting the consistence and acrimony of the urine, gently stimulating the organs to secrete it more plentifully, and thus preventing its too long stay in the bladder; and by its antispasmodic quality likewise taking off the spasm which frequently happens upon the urinary organs, which prevents its being secreted in proper quantity, and causes many of the saline and earthy particles, which nature intended to throw off by this evacuation, to be retained, as not being capable of passing the vessels when their diameter was contracted.

Bath waters externally used as expectorant.

Whether the Bath waters are more efficacious than common water in promoting the discharge by expectoration, I have before mentioned is not ascertained. A priori, we might imagine this to be the case, from their possessing a superior degree of stimulus; and I have several times seen them of great service

service by these means in gouty coughs, wherein this discharge was of the greatest advantage; and I have even seen the fit entirely carried off by these means.

The difference of the Bath waters from common water, with respect to the other indications, is too trifling to merit our regard.

Contra Indications of the EXTERNAL USE
of the BATH WATERS.

What has been before said on this head of common water,* relative to its mechanical action on the surface of the body, is in a great measure applicable to the Bath waters.

'Tis true, indeed, that their relaxing and softening qualities are not so great, owing to the astringent substances which enter into their composition; but this difference is too small to make any material alteration in a medical view, and consequently wherever the warm bath was contra indicated on that account, there the

S 3

Bath

* Vide page 92.

Bath waters likewise are likely to prove detrimental.

It is almost unnecessary to make the same observation relative to their rarefying qualities; but with respect to their specific effects, there is a considerable difference.

In fevers,

Thus the warm bath is probably, as a stimulant, of great service in many fevers, where the strength and spirits are greatly depressed. But the Bath waters in such cases, although they possess a more powerful stimulus than common water, are improper, because their stimulus is more of an inflammatory nature, which in such cases would be highly injurious.

In inflammation.

The Bath waters, for the same reason, are dangerous in all fevers attended with local inflammation, as of the lungs, bowels, &c. and particularly of the brain, or its membranes. This holds true of external inflammation likewise, as of the ophthalmia, and other inflammatory affections* on the surface of the body, the erysipelas particularly, in which their use is

* Cancerous complaints are observed to be aggravated by the Bath waters.

is remarkably improper. The rheumatism and gout have been before mentioned as exceptions to this general rule.

The use of the warm bath has been very properly condemned in those cases that are subject to hæmorrhagy; and in these the Bath waters are still more improper, as possessing a greater stimulus, as well as equal rarefying qualities. This holds true, particularly in consumptive complaints of the pulmonary kind.

In hæ-
morrhage.

The greater stimulus of the Bath waters likewise renders them highly improper in immoderate menstrual evacuations.

In im-
moderate
menstrual
discharges

What has been observed of the impropriety of using the warm bath in plethoric habits, is still more necessary to be attended to in the use of the Bath waters. This holds more strongly if the patient has been subject to any of the symptoms that usually precede apoplexy, as vertigo, increased sleepiness, &c. The necessity therefore of a compleat evacuation in such habits, previous to the use of the Bath waters as baths, is too obvious to be insisted on.

In pletho-
ra.

The

In diarrhæa.

The use of the waters in this manner has been, probably for the same reason, condemned in the diarrhæa; but unless this be attended with fever, or an extreme degree of irritability,* I think the Bath waters, as I have several times experienced, are so far from being dangerous, that they are in general a safe and effectual remedy.

In obstructions of the viscera.

Bathing in the waters of this place is likewise generally forbidden in obstructions of the bowels, and other abdominal viscera. On this subject I must repeat what has been before observed in the first volume of this work,† that where we are certain any such exist, as in the case of schirrhous, this caution is very proper; but scarce any disorder is oftener imaginary than that of which I am now speaking, and the name is applied to many complaints in which the Bath water, thus used, is a safe and effectual remedy. What seems to come most properly under this denomination, that can be judged of by any

* Vide page 60, note.

† Page 369.

any external symptoms before it goes so far as to form schirrus, is the cachexy; and in many of the stages and degrees of this disorder, the Bath waters are perfectly safe, and frequently very beneficial.

A tendency to dropfy likewise, indicated by œdematous swelling of the legs and ancles, is generally thought to contradict the use of the warm bath, and with reason, on account of the absorption of fluid to which it gives occasion. This cause might seem to hold with equal force against the use of the Bath waters in a similar manner; yet there are undoubtedly several cases of this kind in which bathing in the Bath waters is of the greatest service, particularly those which succeed fits of the gout, and those likewise which come on after accidents, as sprains, &c. The stimulus of the Bath waters here evidently counteracts the bad effects of the absorption of the fluid, by causing it to be taken up again by the proper vessels, and evacuated out of the body by the excretions suitable to it.

In dropfy,

Warm bathing is generally thought injurious in rupture, or hernia; and this is, I believe,

In hernia.

I believe, by many thought to be the case with the Bath waters also. How far this may be consonant to general experience, I know not; but from what I have myself had an opportunity of observing, cannot think it well founded. The common opinion is, that the water, by its relaxing quality, enlarges the aperture thro' which the intestine had passed, and thus gives opportunity for the protrusion of it in a greater degree. But the Bath waters, I believe, much more commonly prove stimulant, and urge the muscles to contract and exert their tone than relax them. I have seen two instances of this kind, one an umbilical, and the other an inguinal hernia; the first of which disappeared entirely by bathing in these baths, and the other was greatly reduced in size.

In extreme
weakness.

The Bath waters, as well as baths of common water, are likewise very properly forbidden in cases of extreme weakness. For although their cordial and strengthening qualities be very considerable, yet in order to their succeeding properly, some degree of strength is necessary on the side of the patient, otherwise they, like other remedies of the stimulant kind, rather oppress

press and load than relieve nature. Hippocrates has made an observation,* which I take to be of this kind, and which is applicable in the present case. This rule is well known to hold good of the cold bath, which, if used when the patient is very weak, is apt to increase that disposition; but if delayed until some strength has been acquired by other means, proves an efficacious remedy in the same intention,

But the Bath waters are not only prejudicial in such cases, by means of their stimulus, but likewise by the evacuation they produce. Persons in that state are generally subject to have the perspiratory discharge easily excited, and often very profusely. The Bath waters, though perhaps less exceptionable on this account than common water, are still so much so as to render their use in such circumstances improper. The like may also be said of all disorders

* Et calida lavari, donec quidem corpus superat ejus exhibitionem, florere corpus facit. Quum vero superatum fuerit gracile corpus facit. *De locis in homine*, §. liii.

In another place, he expressly forbids it to those who are much debilitated. Neque debilitatos lavari oportet. §. xlii. *De visu acutorum*.

disorders whatever wherein this evacuation is increased * to a morbid degree.

OBSERVATIONS *on the Method of Using*
the BATH WATERS.

As to the
choice of
the baths.

As to the choice of the baths :—

As rela-
tive to
their diffe-
rent heats.

This may be considered in two lights ; one, as to the degree of heat, and the other, as to their specific qualities.

As to the first of these, I have before mentioned the heat of the different baths as varying about four degrees in their native heat from one another. Thus the King's bath in the hottest part is 112 degrees, or nearly so, the Cross bath about 108; and the Queen's bath is much about the same heat with the Cross bath ; but as this receives all its water from the King's bath, it cannot be called its native degree of heat. I believe the heat in the King's bath never falls below 105 degrees, nor below 100 in the Queen's and Cross baths,
in

* Dr. Oliver, sen. mentions violent sweats as contra indicating bathing in the Bath waters. Vide his Practical Dissertation on the Bath waters, p. 77.

in the coolest parts; but of this I am not certain, as there is a pipe which carries off part of the water as it rises into the cistern, whose bore may be occasionally contracted, and thus make it to fill quicker or slower, and of consequence in the former case increase, and in the latter diminish the degree of heat. What difference this may make, according to the quantity let to run to waste, I cannot say; but believe what I have set down above to be the general temperature. Such are the degrees of heat of the public baths; but if an inferior degree be desired, it may be had at the Abbey bath, where there is a very ingenious contrivance for a tepid bath, where the water is suffered to cool without exposure to the air, or loss of its volatile parts.

When, therefore, the bath is used as a stimulant, as in paralytic cases, the hottest part of the King's bath, or the Hot bath, is preferable; where as an antispasmodic, as in the tetanus, hypochondriac complaints, and other nervous diseases, the cooler parts of the King's bath, or the Queen's, are more proper; where a mild diaphoresis

diaphoresis is desired, the Queen's, or Cross baths, or perhaps a still lower degree, are most effectual. No general rules can be laid down that may not be liable to exception; but in the main, I believe, the same directions that have been given with respect to the heat of the warm bath, considered as of common water, will answer with the Bath waters.

As to
their specific
qualities.

The different specific qualities of the several baths may likewise be here taken into consideration in the regulation of our choice of them. Whether these, exclusive of the effects of the different degrees of heat, vary so much as to make any sensible difference in the effect of the water outwardly applied, I cannot determine from experience, and I am apt to think it not very considerable. But as the peculiar qualities of the waters certainly cause them (when taken internally) to vary from one another in their effects, it may not be improbable that the same holds in some degree of their external application. Thus in cases where the stimulant qualities of the waters are wanted, as in the palsy, the King's bath would be most proper; where the sulphureous parts
of

of the impregnation should be thought to have any peculiar efficacy, as in some cutaneous disorders, the leprosy* for instance, there the Hot bath, as being thought to contain this ingredient in greatest quantity, would be preferable; and where a less stimulus was necessary, and the urinary discharge to be promoted, there the Cross bath, as being accounted most diuretic, might be more adviseable. But although I mention this more as matter of conjecture than as any certain induction from fact or experience, yet, as the experiment can do no harm, and seems consonant to analogy, I think some attention should be given to it.

This, as well as the foregoing, must vary considerably according to circumstances. Formerly a longer stay in the bath was recommended than is common in modern

Time of
stay in the
bath.

* Part of the Hot bath was, until lately, divided from the rest by a wall, and appropriated to those who belonged to a hospital for this complaint, called the Leper's hospital, and the bath was called the Leper's bath. Probably this choice of our ancestors of this spring for such a purpose was not merely accidental, but arose from observation of its superior efficacy in that disorder, which they had much greater opportunity of making than at present, as the disorder was much more common in former ages.

modern practice ; at present from ten, or even five minutes to an hour, is the usual extent : But formerly, two, three, and even four hours stay is said to have been, in some cases, advised. The same general rules are here applicable as to common water. Thus if we make use of it as a stimulus, as in the palsy, the common time of stay is from 15 minutes to half an hour ; and I have observed, that it may be longer continued in, without losing its stimulant quality, than a bath of simple water, as its stimulus is not only more powerful, but also more permanent. The same rule may be said to hold of other cases, wherein its stimulus is of service, as in some contractions of the limbs, such as often come on at an advanced time of life, which an ingenious writer has thought to proceed from the stagnation of the coagulable lymph, which stops the circulation thro' the vessels already become rigid and unelastic by age, and consequently less able to propel the fluids* through them in the course of circulation.

When

* Vasa rigida, & inde per lympham sanguinis coagulabilem obturantur. A vasis lymphâ obturatis (*contractura*) frequentissime oritur ; in senectate quidem, quia hoc vitæ tempore
vasorum

When used as an antispasmodic, a longer stay is in general (as has been before observed of a bath of simple water) adviseable. But here we should distinguish, whether we can properly ascribe its antispasmodic powers to its stimulant or its more properly sedative qualities. Thus in the palsy, a contraction of the muscular parts often happens from the weakness of the antagonist muscles; and in this case the Bath waters act as antispasmodics, by means of their stimulant qualities.* The same may be said in some degree of the hypochondriasis, which is with most probability ascribed to a defect of irritability of the nervous

vasorum irritabilitas minor est. Et si motus diminuat, ut hujus modi exoriretur morbus necesse est; nam vasa in ligamentis minutissima ipso motu stimulantur & ad contractionem impelluntur. Utile igitur ad vasorum actionem augendam erit balneum. *Parr's Thesis.*

* The Bath water here cures the contraction by exciting the muscles which had been weakened, into action, and thus restoring the due balance between them and the respective muscles, that serve for the contrary motions. Thus in a palsy of the hand, the fingers are generally in a contracted state, or grasped inwards from the loss of strength in the extensors, which, if we can restore to them, the motion of the hand again becomes perfect. Most paralytic limbs are in a contracted state in some degree, especially the hand and arm, because the extensor muscles being much weaker than the contractors, are generally first and most powerfully affected.

nervous system. But in other cases, the bath seems to act by its more purely sedative powers. Thus in cases where the whole system is affected, and the nervous influence unequally distributed, as in the hysteric disease, epilepsy, &c. or where the affection is partial in consequence of some local stimulus, as of a stone passing the ureters, or the gall ducts; in these, I say, a long stay in the bath is necessary, which sometimes (as in cases of the latter kind) admits of scarce any other admeasurement than by the effect produced. It is proper to observe here, that when so long a stay is thought necessary, that the more temperate baths should be employed. When used, as they frequently are with a diaphoretic intention, as in the rheumatism, a pretty long stay is generally thought necessary, in order to procure a large evacuation by sweat. But if it be true, as many of our best modern practitioners are of opinion, that the same good effects may be produced by a very moderate and inconsiderable degree of this discharge, a less time will suffice, and is much more eligible, as it does not weaken the patient nearly so much, and does not expose him to such hazard of getting cold afterwards.

afterwards. I believe the same will hold good of most other complaints, wherein it is thought necessary to promote this discharge.

If used as a diuretic, the same rules, as to stay in the bath, will suit, as are directed in the case of simple water, saving that a less time is necessary in proportion, as the Bath waters possess this quality in greater degree than common water.

With respect to the other indications, nothing is necessary to be said, as they are only of a secondary nature, and depend on the foregoing.

If the Bath waters are used with a stimulant intention, as in palsy, all the means that further this purpose are proper to be used. Motion of the body, therefore, whilst in the bath, is very advisable, especially of those parts that are principally affected. The common method is to walk about in the bath, supported, if necessary, by a guide; and this motion is often found much easier to perform than could be imagined, by many who use this remedy, whose weak state would not allow it in

Method of
using the
baths.

any other place or manner. Friction likewise in such cases, whilst in the bath, is very serviceable, especially on the part affected. This is generally performed with brushes, which serve the purpose very well.

The same directions are in a great measure applicable to the baths, when used as antispasmodic remedies, saving that friction is not so necessary, except in some local affections, as contractions of the limbs, &c. and even motion itself should be cautiously used in such disorders as are apt to be excited by it, as some kinds of nervous disorders, spasmodic vomitings, &c. But in general, as much motion in the bath as can be used without fatigue, is proper.

Formerly the practice was, after bathing, to put the patient into a bed, or between blankets, heated to a considerable degree, and often with a fire in the room, in order to encourage profuse sweating; * but of late this method has been disused, and a more moderate one substituted, as it was found that the former was not only dangerous, on account of the heat excited, but

* This practice is very ancient. Vide note, p. 117.

but also frequently defeated the very point aimed at, viz. a profuse perspiration. It is now found, that when the heat rises beyond a certain pitch, that this discharge stops altogether,* and that the best means of restoring it are by lowering the heat of the body by cool liquors and fresh cool air.† But this discharge, even when as large as could be desired, is not found to answer any purpose which may not be effected by a slight diaphoresis, and is very inconvenient on other accounts, as being very weakening, subjecting the patient to danger of a putrid disorder by the re-absorption of his perspiration in which he lies, as in a bath, and to cold from the exhalation of its moisture; and moreover rendering a subsequent exposure to the air during the day of bathing much more hazardous than if a more moderate course had been pursued. The method at present in use is, for the person who bathes (if it be in the morning) to go to bed for
T 3 a short

* This is only applicable to sweating in bed, since people in a bath, or by great exercise, will often sweat when heated above the degree which stops all perspiration in a bed.

† Vide Alexander's Experiments.

a short time afterwards, rather to compose himself after the hurry and fatigue of bathing, and to give the body an opportunity of cooling gradually after the great heat to which it had been exposed, than for the sake of promoting any evacuation by the skin. If the weather be cold, the bed is slightly warmed; if moderate, and he go again into the same bed in which he had lain during the night, nothing of this kind is necessary. No more bed cloaths are laid on the bed than the person is accustomed to in health; nor is there any fire or other means used to make the chamber warmer than usual. By pursuing this course it is found that the bather, if able in other respects, may, without any hazard, expose himself to the air, if moderately warm on the day of bathing, which was formerly strictly forbidden on account of the danger of getting cold, which was owing much more to the injudicious treatment above-mentioned than to any effect necessarily attending the use of the bath. But though I think the above-mentioned caution concerning going out on the day of bathing carried greatly too far, it is not at all my intention to advise a rash exposure to the
air

air at all events. The body is always on the days of bathing more sensible of cold, and more susceptible of injury from it, than at another time; and therefore this caution, in cold weather, especially if moist,* is very proper to be observed, as experience shews.

The time of day for bathing has in the public baths been by custom immemorial fixed between the hours of five and nine in the morning, as the baths are let off at the hour last mentioned. Whether this arose from observation of their good effects being best exerted at this time, or from a motive of convenience to the public or the attendants on the baths, I cannot say: But as I think some regard should be paid to an old-established custom, which might have been set up for good reasons, though we are not at present acquainted with them; and as many other great writers, Hoffman especially, (who seems to be particularly acquainted with the use of the warm bath) have concurred in the same opinion as to the time of using that remedy; and as
that

Time of
day.

* Moist air checks perspiration more than a clear air of a much cooler temperature.

that time, as I have before observed, is more likely to favour its operation as a stimulant, for which it is principally used: For these reasons, I say, I cannot help thinking the morning the best time in general for the use of the Bath waters in this way.

But as many cases may occur where an immediate trial at any hour may be desirable, and others to which the evening may be better suited, such as several spasmodic diseases of the former kind, and others where its diaphoretic and sedative qualities are indicated, as in the latter case, a convenient and elegant bath may be had at any hour at the Abbey baths, filled with fresh water for every separate person who uses them, of nearly the same heat and quality with the King's bath water. This is particularly suited to those to whom exercise is recommended, and the season of the year too severe to admit of it on the day of bathing, except used before the trial of the bath.

Time of
year.

Formerly the use of the Bath waters, as well externally as internally, was confined to the summer months; but for many years past the colder, or rather more moderate seasons,

seasons, as the spring and autumn, have been preferred. But I am apt to think that the reputation of the waters has been no gainer by the change, and that their use as baths is likely to be much greater in a warm than a cold, or even a moderate season. This observation has been made in the first volume of this work,* relative to the waters when drank, and is much more applicable to them when used as baths, as they act in that form more immediately by those qualities to which warm weather is favourable, and which cold weather counteracts.† That this was the opinion of our ancestors, the hospital in this place, called by the name of Bellott's hospital, is a remarkable instance. In this there is a provision for a certain number of patients whose cases are adapted to the Bath-waters, for the six summer months, but none for the remainder of the year, probably on the supposition that the summer season only was suited to their use.

Modern

* Page 411.

† For the time of the year, the Spanish and Italian authors prefer the spring and fall; but with us I hold the months of May, June, July, and August to be the best.

Jones, Bath of Bath's Ayde, published 1572.

Modern practitioners likewise appear to be of the same opinion.

Dr. Oliver, sen. in his Practical Dissertation on the Bath waters,* seems to think that the summer is the most proper season both for bathing and drinking the waters; and Dr. Oliver, jun.† and Dr. Charlton,‡ both profess the same sentiments; the latter of which gentlemen has, in his excellent Treatise on this subject, (in the part quoted) given a very remarkable instance of the truth of this position, relative to paralytic complaints; and if I may trust my own experience, I have observed the same thing in respect to other disorders, especially gout and rheumatism, in which the water is thought to be serviceable by means of its diaphoretic quality.

How often the use of the bath should be repeated, and how long continued.

The frequency of the repetition of the bath, and the length of time which its use should be continued, it is evident, are questions

* Page 48, 74.

† Page 90. Essay on the use and abuse of Warm Bathing in gouty cases.

‡ Inquiry into the efficacy of warm bathing in paralytic cases, page 24.

tions which must be determined by the nature of the particular case, and can only be answered in a general manner.

The common practice at this place is to bathe from once to three or four times a week, some use it every day; but so frequent a repetition requires a strong habit and constitution, to support so large and frequent evacuations by perspiration, as this practice would be likely to induce. The Russians, indeed, use much hotter baths almost daily; but this, as I have before observed, is a customary exercise with them in health, and not applicable to our climate or constitutions. Hippocrates likewise, with whose countrymen the warm bath was much in use, advises it every day, and even twice a day; but this, as well as the foregoing, is no rule for us, for the reasons before given; and besides, the Greeks did formerly, and the Russians at present, take measures to prevent the increase of perspiration, which are not in use among us; the former, by going into a cold bath after the use of the hot one; and the latter, by rubbing the body over with snow, which checks that discharge,

discharge, and of consequence prevents the weakness which its excess is apt to occasion.

Indeed, I believe the Bath waters might be used frequently with greater safety than a common bath, as they are more stimulant, and less diaphoretic, and of consequence do not weaken the body so much as a bath of common water.

It is proper to observe, that what is here said relative to the frequency of bathing, is only meant to affect chronical complaints, and such as require a long continuance of that remedy.

The time of the baths being continued, as well as the frequency of its being repeated, must depend on the nature of the case.

In palsy, wherein its principal use is probably as a stimulant, it is sometimes employed for a long time together. Dr. Charlton mentions several who have bathed twice a week for six months successively, and some much longer, and received great benefit. One of these found not the least benefit by the waters for three months,

yet

yet recovered perfectly by their longer use. And another, where eight months had elapsed with scarce any perceptible alteration for the better; yet, by persisting in their use, a compleat cure was obtained. I have known an instance myself of this disorder, where the bath was continued at the rate of twice a week, and often more frequently, for the term of seven and eight months, and this repeated every year for three years together, and with a constant, and gradual, tho' slow amendment. This circumstance is greatly in favour of the Bath waters, and evinces their superiority over other remedies of the stimulant kind, which, though at first they appear to be serviceable in this disorder, soon lose their effect by habit. It ought likewise to be a caution to those who use them for this complaint, not to despair of relief from bathing, too early, provided it does not appear to be contra-indicated in other respects, since it has proved of the greatest service at so late periods. Had those of higher rank who resort to Bath for this disorder, been as much under the command of the physician as the patients of the hospital, I do not doubt many more cures

would

would have been performed than have been; but, unfortunately, this disorder is too often combined with a fretfulness and impatience of temper, which is, indeed, produced by it, and which renders the person who labours under this complaint apt to be discouraged by the trial of a remedy, simple in itself, whose operation is slow, and produces little immediate sensible effect of any kind; and though not painful, or very troublesome, requires some confinement and constant attention.

Contractions of the limbs likewise require very frequently a long use of the waters; but in these pumping is generally preferred to total immersion.

Cutaneous disorders likewise, as the leprosy, &c. often require the continuance of the bath for a great length of time to perfect a cure, as four, five, and six months, and often a much longer time.

Some cases of the gouty and rheumatic kind also require a long continuance of the use of the bath;* but in general from three weeks,

* By the old accounts this seems to have been the practice of former physicians at this place, when bathing was more in vogue than at present. Vide *Pierce and Guidott on the Bath waters.*

weeks, or less, to two months together, is the usual practice in most of the disorders wherein bathing is recommended.

As to this article, the directions* before given, relative to the warm bath, are applicable here in general; but more caution is necessary with respect to fermented liquors, and high-dressed food; and this more particularly on the days of bathing, especially if the bath be used in the evening. This caution must be understood only of such cases as stimulants are likely to prove injurious to, since in others, as in paralytic cases, the moderate use of such things may be of service, in coinciding with the effects of the waters.

Regimen of life proper to be observed during a course of bathing in the Bath waters.

Attention should likewise be paid to the passions of the mind during the use of the waters in this way. Serenity of mind is always favourable to health, and is here especially necessary to be preserved. Hoffman mentions, from his own knowledge, that hectic fevers, and other very dangerous and often incurable disorders, were produced by using the hot bath after the
mind

mind had been agitated with rage and anger. This caution, it is obvious, must be at least equally applicable to the Bath waters.

Moderate exercise during their use is always recommended, but with caution, not to carry it so far as to overheat or fatigue the body.

Where this cannot be used, either from the severity of the weather, or inability of the limbs to perform or endure it, friction is an useful substitute, and ought always to be used, when it can conveniently, and consistently with the nature of the complaint.

Moderate laxity of the bowels is also full as necessary during a course of bathing in these waters, as in the common warm bath. If the patient be young, and the costive habit be attended with inflammatory symptoms, some of the saline purgatives, as Glauber's or Rochelle salts, or vitriolate tartar, are proper; but if the contrary be the case, the aloetic purgatives, either simple, or combined with the gum resins, as myrrh, or guaiacum, are preferable. Formerly, a course of evacuation

ation by purging, and sometimes of vomiting besides, was almost always premised previous to the use of the Bath waters in nearly all complaints, by way of preparative, as it was called. But of late years this indiscriminate mode of practice has been, in some measure, laid aside; and physicians are now in general content to prescribe such medicines when a necessity for their use appears from the nature of the disorder itself.

I am far from meaning here to encourage a rash use of such important and active medicines as the Bath waters, but to recommend a method of using them upon rational principles, and to avoid that rotin of practice which has prevailed too much in all branches of medicine, and is the natural produce of ignorance and indolence. I am well satisfied, many cases require evacuant medicines previous to the beginning a course of the waters, and during their use also; but I am likewise assured, this is by no means universal, or indeed near so common as is generally supposed. Many who find the greatest benefit from these waters, have derived their complaints from excess of these evacuations,

U

ations, and consequently stand more in need of cordial and restorative medicines than a farther continuance of what has been the source of the disorder. The same likewise may be said of those who are much debilitated, be the cause what it may. In such cases, I think, I have seen a gentle emetic succeed best, as it is equally efficacious as an evacuant, and much less weakening to the patient than the other means of promoting a discharge. Dr. Williams, in his treatise on the waters of Aix-la-Chapelle, (which in many respects resemble those of Bath) relates many instances of the bad effects of purgative medicines, taken indiscriminately during the use of the waters; and with great judgment highly condemns so absurd and unscientific a practice. By his account, a course of this kind was looked upon as indispensable previous to the trial of the waters, and even during their use; and their choice of medicines of this kind seems not ill adapted to so absurd a practice, being in general Glauber's salt; the impropriety of which, in many of the cases that apply to such waters for relief, is too obvious to need explanation.

I cannot

I cannot quit this subject without making a few remarks on the propriety of advising other medicines in general along with a course of the waters, either internally or externally used.

If medicines are proper during the use of the Bath waters.

Some modern writers have with great vehemence inveighed against the practice of recommending any other medicine (except perhaps some trifling prescription to keep the body soluble) during the use of the Bath waters. Among these, the late celebrated Dr. Lucas, of Dublin, is among the chief : He professes great indignation at the custom of “ loading (as he calls it) “ persons with nauseous and incongruous “ shop medicines, who come for the purpose of using the waters of a medicinal “ spring ;” and he employs the hackneyed argument, that “ if medicines could have “ been of service, they might have “ tried them at home, and the patients “ not have been at the trouble and expence of coming to Bath for that purpose.”

There is no practice, however proper or judicious, that may not suffer in the opinion of the world by false or invidious

misrepresentation. This is especially the case with medicine, of which so few are capable of judging, and so many pretend to decide. The custom of giving nauseous and bulky doses of medicine has been, it must be owned, but too common; but that it was more frequent at Bath than in other places, I believe, will be difficult to be proved. But since the late improvements in pharmacy, this mode of practice has been succeeded by another more elegant, as well as at least equally effectual, and these improvements have been adopted at Bath as well as at other places. As to incongruous medicines, as he calls them, or such as are inadequate to, or contradict the purpose intended, nobody doubts, such are improper; but that these are oftener advised by the Bath physicians than others, may be a doubtful case, and wherein the Doctor's judgment may be justly questioned, especially as his expression is in itself vague, and unsupported by any fact which he has produced.

As to the propriety of giving medicines at all during the use of the waters, I declare it to be my opinion, that they may in many cases be administered with great advantage.

advantage. I know no effect to be wished for from the Bath waters which medicines of a similar intention might not, judiciously given, promote; nor any operation of such medicines which the Bath waters would not rather assist than counteract.

This is equally true of their internal as their external use, such only excepted as may be affected by the waters in the way of chemical decomposition, which I have mentioned in the first volume of this work. But when the waters are used externally, it is obvious that no medicines need be excepted to on that account. I have myself seen mercurial, antimonial, and chalybeate medicines, opiates, bitters, the bark, musk, castor, asafœtida, with many of inferior efficacy, taken during a course of bathing with the best success.

Hoffman,* with whom the warm bath was a favourite remedy, and who was

U 3 perfectly

* Denique & hoc addendum puto: quod operationem medicamentorum, quæ magna aut heroica sunt, balnea tepida omnium optime secundent, ut longe nobiliorem effectum exserant. Nunquam facile secundum nostram sententiam atque experientiam mercurialia modo salivationis, modo evacuationis per sudorem sine, five in lue venerea, five in aliis

perfectly well acquainted with its virtues, was so far from advising the omission of other medicines during its use, that he recommends it expressly along with a great number, for no other purpose than to second and improve their efficacy. Why this advice may not, with equal propriety, be applied to the Bath waters, I am at a loss to say.

As to the other trite objection, that medicines might be tried at home without the trouble and expence of coming to
Bath

aliis rebellibus morbis, propinanda sunt, nisi balnei usus intercedat. Hoc enim dum relaxat summam cutim porosque aperit, id effecit, ut corruptus humor non tanto cum impetu ad fauces vel etiam alia loca urgeatur, sed magna ex parte per tubulosam cutis substantiam ex intimis sedibus evocetur: ut adeo tutó admodum curam cum mercurialibus instituere liceat. Veteres, chymicis & validioribus medicamentis destituti, in rebellibus morbis hellebori albi usum multum præstabant; sed nunquam eum facile adhibebant, nisi prius in balneum corpus demissum fuisset; quoniam id non modo fluidiores & mobiles reddit humores, sed etiam vias relaxat, ut eo melius peccans humor adducatur. Neque etiam tunc facile periculosum symptoma a validioribus purgantibus, quæ spasmò operantur, metuendum fuit. Martialis porro virtus in chronicis morbis, atque etiam in malo hypochondriaco, non contemnenda est; sed ne astrictione noceat balneum opportunissime interponitur, quo humores ad motum & exclusionem eo facilius præparentur. Et nullum quoque dubium est, quin Cortex Chinæ, aliaque adstringentia, quorum magna vis est in intermittentium paroxysmis cohibendis, longè tutius sub decenti balneorum usu, usurpari possunt.
Hoffman, de balnear. aq. dulc. usu.

Bath for that purpose, is equally frivolous. If Bath had been advised merely as a more proper place than any other for the trial of medicines, which might be had any where else, this argument might have some weight; but as this is not the case, and medicines are only advised to second or concur with, or as preparatory to the use of the waters, which can be had only (in perfection) there, it can have none. Why those who frequent this place for their health should be confined to the waters only, and not be suffered to make use of every other means that art can furnish, those who made the objection are best able to explain. As to the impropriety of directing medicines to those who come to make trial of a mineral water, I can only answer, that I never understood the intention of the patient was to govern the directions of the physician. Whatever the former may be, it is the duty of the latter to advise what his judgment directs; and those who have already laid down a plan for themselves, have no occasion for such directions, and, consequently, had better spare themselves the trouble and expence of procuring it.

I should

I should not have said so much on this subject, had I not been well assured that such notions had been industriously propagated from interested motives, by some from whom it might have been least expected. But though I am fully satisfied of the propriety of administering other medicines in many cases during the use of the Bath waters, I would by no means be understood to advise a farrago of physic. The greatest instance of the improvement of medicine, in the present age, is the simplicity to which it is reduced: Yet the best writers allow, that some degree of composition is often necessary. It has been the fate of most improvements to be carried to an extravagant length; and perhaps this may have been the case in the present instance. Because some have advised too much medicine with the waters, others have concluded that none was necessary. But the truth here, as in most disputed points, seems to lie between the two extremes. Medicines concurring in intention may certainly be administered during the use of the waters; but, on the other hand, due regard must be had to their bulk, frequency of exhibition, &c.

when

when the waters are taken internally; and to the degree of effect they are likely to produce when conjoined with the waters, whether the latter be internally taken, or externally applied.

The immersion in the baths at this place is seldom total, and, I believe, the same rule holds in hot baths in general. This, I imagine, was derived from the old notion of revulsion; it being the opinion, that the application of warm water to any part of the body invited the blood to that part. The physicians therefore, whilst this notion continued, were fearful of advising the head to be bathed, for fear of accumulating the blood there, and endangering its stagnation or extravasation in a part so important to life.

As to the degree of immersion.

But although this theory has been in a great measure exploded, the practice built upon it still continues in a great measure. Indeed of late years it has been customary now and then to direct a total immersion; but except this was particularly ordered, it was seldom done in the usual method of bathing.

A pedi-

A pediluvium of the Bath waters is likewise in frequent use. This, I cannot forbear observing, is managed in a much better manner than in the common way. The vessel containing the water is much deeper, and consequently covers the legs, which in the usual method are exposed to the air, which is often very detrimental, and more than counterbalances all the good effects of the application of warm water to the extremities. As to the difference in effect of a partial bath from an universal one, what has been already said of common water is equally applicable to the Bath waters.

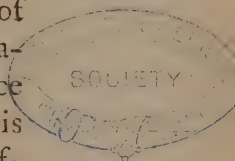
Of pump-
ing.

The Bath waters are not used in the way of quiet immersion only, but sometimes are thrown with a degree of force upon the part, as in pumping. Of the nature of this in general, and the circumstances wherein its effects differ from quiet immersion, I have spoken in the former part of this work.* One thing is necessary to be observed here, that the heat of the water used in the pumps is several degrees hotter than the water of the bath,

as

as the former comes immediately from the reservoir which supplies the bath, into which the spring first rises, which is underground, and consequently the water it contains hotter than the other in the bath, which has so large a surface exposed to the air.

Pumping has been, of late years especially, in great use at this place. It is mostly employed in local complaints, and sometimes, I believe, in general disorders, wherein the patients are looked upon as too weak to bear a total immersion. The intentions with which it is used appear to be much the same with those of the bath. Thus it is used with great success in the palsy, which is indeed generally, in some measure, a local complaint, as one side of the body, or some particular limb, is more affected than the others. Dr. Charlton mentions several cases of palsy of various kinds, wherein it was of the greatest use; and this, as well as bathing, makes a part of the hospital practice in this disorder. The stream of water is generally directed to the limb, or part affected, and sometimes to that part of the spine whence the nerves, that supply the
part



part affected, issue forth. Pumping has likewise, by the same quality, been found very efficacious in reducing dislocations of the vertebræ, whether occasioned by accident, or disorder. The muscles and ligaments that serve to retain these in their proper situation, are in this case generally over-strained, and injured in their tone; but by the stimulus of the stream of water falling on them, are gradually excited into action, and thus assist greatly to bring the dislocated vertebræ again into their proper places. Contractions of the limbs likewise have been greatly relieved by pumping, in which disorder it is generally made use of, either by itself or joined with bathing.

I have likewise seen a disorder of the knee greatly relieved, and nearly cured, by pumping, which was owing to an over-distention of the capsular ligament, occasioned by too great exercise in walking. The eminences or condyles of the thigh bone, and of the tibia, not being retained firmly in their places, where they mutually pass one into the other at the articulation, were subject on motion to frequent partial dislocations, which occasioned the edges of the bone to grate against each other,

other, and caused exquisite pain. Besides this, there seemed to be a deficiency in the secretion of the synovia, or liquor, that serves to lubricate the internal part of the articulation, as there was a grating noise heard on the motion of the joint. There was likewise a considerable degree of external swelling, and an almost total lameness of the whole limb. All these complaints were nearly removed by the use of the pump, continued for about three months successively. Some little weakness and pain on any violent motion still remained, but the use and motion of the limb, in all directions, was perfectly restored; the crackling noise, on motion, removed; and the tumor reduced. 'Tis proper to observe on this case, that a stillicidium of common hot water had been tried before without effect.

White swellings likewise, when beginning, and before the formation and collection of matter, are often discussed without coming to that crisis, which is almost always productive of the loss of the motion of the joint, and often of loss of the limb itself, where it is formed.

Pumping

Pumping is likewise very efficaciously employed as an antispasmodic in nervous cases. Dr. Charlton mentions a remarkable instance of an involuntary motion of the right arm, attended with convulsion fits, which was entirely cured by a long and steady adherence to a course of pumping upon that and the spina of the back.

I have likewise seen a nervous head-ach cured by pumping the head with Bath waters. Dr. Percival has mentioned a remarkable case of a great pain in the head, evidently of the spasmodic kind, which was greatly relieved by a stillicidium of hot water let to fall on the part of his head which was most affected, joined to the use of the warm bath.

I have likewise seen a nervous deafness entirely cured by pumping on the side of the head.

Pumping is likewise used successfully in the gout, towards the end of the fit, when the pain and inflammation are nearly gone, yet the swelling remains, as frequently happens towards the decline of life. In fits of the gout likewise, that have been protracted to a great length, pumping is of great service ;

vice; gently stimulating the absorbent vessels to take up the fluid, and by its diaphoretic quality promoting the means of its evacuation.

By its last-mentioned quality, and perhaps by its stimulus likewise, it is often of service in rheumatic complaints, especially when fixed in any particular part, as the hip, loins, arms, &c. But here great caution should be used not to make trial of it as long as any inflammation or fever remains.

Pumping is likewise, I see, advised in the tinea capitis, or scald head, as it is called, and as is said with good success. But here I suppose it is not used on account of any peculiar good effect to be expected from that mode of application, but only as that is the most convenient method of administering a topical bath to such a part as the head.

Cælius Aurelianus * advises this method of applying the bath to be followed in the
ele-

* Cataclysmus, hoc est aquarum a supernis illisio. *De elephantiasi.*

VAPOUR BATH *of*

elephantiasis ; but I believe the bath is commonly in use at this place in such cases.

These are the general cases in which pumping is indicated as distinct from bathing, though both are often used at the same time, either by pumps in the baths, which are used during bathing, or by pumps on the outside, which may be employed without bathing, called *dry pumps*.

I cannot here omit mentioning a great advantage which I think the Bath waters have relative to this operation over common water, relative to the equability of its heat. If the latter were used for that purpose, it would scarce be possible to make it always of the same temperature ; and probably, as this must be left to servants, it would sometimes be so hot as to scald the part to which it should be applied, and at others to injure the patient by its coldness. But the Bath waters are in no danger of such variation, as they are always of the same degree, which is sufficient for every purpose of a hot bath in every mode of application.

On a vapour bath of the Bath waters.

On this subject I have little to say from experience. A vapour bath of this kind has

has been for some years constructed at the Abbey baths, but from the imperfection and inconvenience of its construction has been little used, if at all. It seems extraordinary, that this should have never before been attempted, since at Aix-la-Chapelle they have been long erected, and in constant use. I doubt not that the same might be easily done at this place, since by the specimen before mentioned it appears, that the heat is sufficient to exhale steam enough for any purpose of that kind. The steam of the waters has some, though but little smell of the sulphureous kind, but is plentifully impregnated with fixible air, as I found by several experiments. As the sulphureous and aërial impregnations are the most important of any, and the vapour that arises contains both in considerable proportion in a volatilized state, it is not unreasonable to suppose that a bath of this kind might be advantageously employed in many cases, wherein vapour is preferable to the immediate contact of the water. I believe, likewise, that the fixible air might, by confining the vapour, be applied in a much more concentrated form than as diffused through

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the

the water in the bath, and perhaps by these means become more serviceable in some disorders where an antiseptic quality should be desired, as in the scurvy, &c. than the bath itself. But this, though I think it bears an appearance of probability, is only offered as matter of conjecture.

The pump is generally used from twenty to a thousand strokes. Formerly, it was used more freely, to three thousand and upwards ; but so large a number is not so much in use at present.

I shall subjoin, lastly, for the use of the Faculty, a List of the Diseases, according to Dr. Cullen's system, (analogous to that inserted in the first volume) in which bathing in the Bath waters is likely to be serviceable.

TABLE of DISEASES.

CLASSIS I.

PYREXIÆ.

ORDO I.

FEBRES.

SECT I.

INTERMITTENTES.

In the intervals of the paroxysms, bathing in the Bath waters may be of the greatest service, especially when the fit is attended with spasmodic symptoms, as in the *Tertiana spasmi, et motibus convulsivis stipata*. CULLEN.

ORD. II.

PHEGMASIÆ.

GENUS XXII.

RHEUMATISMUS.

IDIOPATHICÆ.

Rheumatismus vulgaris. Sauv. spec. 1.

Warm bathing is here very serviceable towards the decline of the paroxysm.

X 2 *Rheuma-*

Table of Diseases.

Rheumatismus calidus. Sauv. spec. 5.

The use of the Bath waters externally is equally proper in this as the foregoing.

Arthritis rheumatica. Sauv. spec. 3.

This is well suited to a trial of the Bath waters externally.

Lumbago rheumatica. Sauv. sp. 1.

The warm bath is well adapted to this species.

Nephralgia rheumatica. Sauv. sp. 4.

This species is well suited to a trial of the Bath waters externally.

Ischias sanguineum. Sauv. sp. 2.

This species, which is owing to retention of the natural discharges, is extremely well adapted to the Bath waters thus used.

*Ischias rheumaticum.** Sauv. sp. 10.

The Bath waters, used as baths, are the best remedies for this complaint.

S Y M P-

* Balnea domestica calida, thermæ etiam sulphuræ præfunt. *Sauvage.*

SYMPTOMATICAÆ.

Rheumatismus scorbuticus. Sauv. sp. 4.

Bathing is certainly very well adapted to this complaint.

————— *metallicus.* Sauv. sp. 10.

Bath waters are highly adapted for the relief of this symptom, externally used.

————— *hystericus.* Sauv. sp. 7.

Warm bathing must be certainly useful in this complaint.

GENUS XXIII.

ARTHRITIS.

ARTHRITIDIS VARIETATES.

I. PRO TEMPORE ANNI.

Arthritis hyemalis. Sauv. var. 2.

————— *æstiva.** Sauv. var. 4.

In both these warm bathing is proper.

2. PRO CAUSA REMOTA.

Arthritis rachialgica. Sauv. var. 11.

Bathing is highly proper here.

* Sauvage advises the warm bath here.

Table of Diseases.

*Rheumatismus arthriticus.** Sauv. sp. 3.

This is certainly suited to a trial of the warm bath.

3. VARIAT. COMPLICATA.

Arthritis chlorotica. Sauv. var. 5.

Warm bathing is undoubtedly proper here.

——— *melancholica.* Sauv. var. 5.

——— *scorbutica.* Sauv. var. 7.

Warm bathing is certainly proper in both these cases.

C L A S S I S II.

N E U R O S E S.

O R D O I.

C O M A T A.

G E N U S XX.

P A R A L Y S I S.

I. I D I O P A T H I C Æ.

Hemiplegia ex apoplexia. Sauv. sp. 7.

Bathing is here frequently of the greatest service.

Paralysis serosa.† Sauv. sp. 12.

Bath

* Sauvage advises the use of sulphureous baths.

† Sauvage advises warm stimulating baths and pumping in the hemiplegia serosa, which appears to be the same disorder under another name.

Bath waters, externally applied, are here remarkably efficacious.

Hemiplegia spasmodica.* Sauv. fp. 2.

I make no doubt the bath would here extremely serviceable.

——— *saturnina*. Sauv. fp. 14.

Warm bathing is here extremely serviceable, and generally effects a perfect cure.

Paralysis metallariorum. Sauv. fp. 22.

Tremor metallariorum. Sauv. fp. 5.

In both these the Bath waters, externally used, are very efficacious.

Paralysis traumatica. Sauv. fp. 4.

This species, which is counted incurable by Mr. Sauvage, is often greatly relieved, and nearly cured, by bathing and pumping with the Bath waters.

——— *rheumatica*. Sauv. fp. 3.

This species is well adapted to a trial of the warm bath.

Hemi-

* Sauvage relates a case of a person who, after having tried all the most celebrated remedies in vain for this disorder, was at last cured by the warm bath.

Table of Diseases.

Hemiplegia arthritica. Sauv. fp. 5.

Bathing in these waters is remarkably efficacious here.

Paralysis rachialgica. Sauv. fp. 2.

Paraplegia rachialgica. Sauv. fp. 5.

Both these are extremely well adapted to the use of the bath, being nearly the same disorder.

Paralysis scrophulosa. Sauv. fp. 5.

Bath waters, externally used, are here worthy trial; but by no means a certain remedy.

Paralysis febrisæqua. Palsy from fever. Charlton.*

In this, warm bathing is extremely beneficial.

Paralysis ab insolatione.

In this I have seen the Bath waters succeed very remarkably.

Paralysis ab evacuatione suppressa.†

In this, whether arising from the stoppage of the menstrual discharge, the lochia,
or

* Vide Dr. Charlton's Inquiry, p. 14, 67, 71.

† Vide Dr. Charlton's Inquiry, p. 17, 25.

or the hæmorrhoids, the Bath waters are worthy a trial, though not always successful.

Paralysis a menorrhagiâ.

In this I have seen the external use of the Bath waters very successful.

O R D. II.

A D Y N A M I Æ.

G E N U S XLIV.

H Y P O C H O N D R I A S I S.

I. I D I O P A T H I C Æ.

Hypochondriasis melancholica. Sauv. sp. 3.

This is extremely well adapted to a trial of the bath.

———— *pituitosa.* Sauv. sp. 4.

Bathing is very proper here.

2. S Y M P T O M A T I C Æ.

Hypochondriasis hysterica. Sauv. sp. 5.

This, when proceeding from a suppression of the natural evacuation, is well suited to the Bath waters.

Hypo-

Table of Diseases.

Hypochondriasis calculosa. Sauv. sp. 8.

I should think this species very proper for a trial of the Bath waters.

G E N U S XLV.

C H L O R O S I S.

I. V E R Æ.

Chlorosis Virginea. Sauv. sp. 1.

This is, undoubtedly, well suited to the use of the Bath waters in this way.

O R D O III.

S P A S M I.

S E C T. I.

I N F U N C T I O N I B U S N A T U R A L I B U S.

G E N U S XLVI.

T E T A N U S.

I. I D I O P A T H I C Æ.

Tetanus tonicus. Sauv. sp. 1.

———— *emprosthonicus.* Sauv. sp. 2.

———— *opisthotonicus.* Sauv. sp. 3.

———— *holotonicus.* Sauv. sp. 4.

The common warm bath* is of great service in all these; and, I doubt not, the Bath waters would be at least equally efficacious.

GENUS XLVII.

TRISMUS.

Trismus traumaticus. Sauv. sp. 2.

Several instances of the efficacy of the common warm bath† in this complaint have been adduced, and the Bath waters are likely to be no less efficacious.

GENUS XLVIII.

CONVULSIO.

Scelotyrbe chorea viti. Sauv. sp. 1.

Bath waters, thus applied, are often of great service in this disorder.

GENUS L.

EPILEPSIA.

IDIO-

* Vide Dr. Chalmers, in Lond. Med. Obs. vol. I. art. 12.

† Vide several cases of this kind in the London Medical Essays.

Table of Diseases.

I D I O P A T H I C Æ.

Epilepsia pedisymptomatica. Sauv. sp. 6.

I doubt not the bath would be of service here.

———— *cachectica.* Sauv. sp. 2.

This species is very proper for a trial of the bath.

———— *uterina.*

When this proceeds from a retention of the natural evacuations, the bath is likely to prove successful.

G E N U S LII.

A S T H M A.

I. I D I O P A T H I C Æ.

Asthma hypochondriacum. Sauv. sp. 4.

Bathing is very likely to be of service here, especially when it depends on a suppression of some of the accustomed evacuations.

2. S Y M P T O M A T I C Æ.

Asthma arthriticum. Sauv. sp. 5.

This kind of asthma is extremely proper for a trial of the Bath waters.

G E N U S

GENUS LV.

COLICA.

Colica biliosa. Sauv. fp. 5.

After due evacuation the bath is very efficacious.

Rachialgia metallica. Sauv. fp. 3.

Warm bathing is of great use in this disorder.

GENUS LVII.

DIARRHOEA.

IDIOPATHICÆ.

Diarrhœa vulgaris. Sauv. fp. 2.

In this the Bath waters, externally applied, are a safe and effectual remedy.

GENUS LVIII.

DIABETES.

I. IDIOPATHICÆ.

Diabetes a vino. Sauv. fp. 5.

This is very proper for a trial of the waters, externally.

GENUS

GENUS LIX.

I. IDIOPATHICÆ.

Hysterica chlorotica.* Sauv. sp. 2.

Bathing is likely to be extremely serviceable in this species.

2. SYMPTOMATICÆ.

——— *emphræctica*. Sauv. sp. 5.

Bathing is extremely proper here.

CLASSIS III.

CACHEXIÆ.

ORDO I.

MARCORES.

GENUS LXVI.

ATROPHIA.

Atrophia nervosa. Sauv. sp. 1.

In this I have seen bathing in the Bath waters of the greatest utility.

ORDO

* Sauvage advises bathing in warm sulphureous mineral waters.

ORDO III.

IMPETIGINES.

GENUS LXXX.

SCROPHULA.

Scrophula vulgaris. Sauv. sp. i.

Bath waters, externally used, are of great service in many cases of this kind, if not too far advanced.

GENUS LXXXI.

SYPHILIS.

*Syphilis venerea.** Sauv. sp. i.

The Bath waters have been used successfully in all the stages of this disorder, wherein warm bathing is proper.

GENUS LXXXII.

SCORBUTUS.

Bath waters are likely to be extremely serviceable in the first stages of this disorder, before it has gone so far as to form external ulcers.

GENUS

* Vide Dr. Oliver's (senior) Essay.

Table of Diseases.

GENUS LXXXIII.

ELEPHANTIASIS.

Elephantiasis orientalis. Sauv. sp. 1.——— *legitima.* Sauv. sp. 2.

In both these I doubt not the efficacy of bathing in these waters.*

GENUS LXXXIV.

LEPRA.

Lepra Græcorum. Sauv. sp. 1.

In this disorder the baths of this place have long been esteemed sovereign remedies.

Lepra indica. Sauv. sp. 3.

I should imagine the Bath waters,† externally used, likely to succeed here.

GENUS

* Probably the Bath waters may be serviceable in several of the other species; but as this disorder is very rare, it can only be judged of from the accounts of others, or from analogy; neither of which in this case are sufficiently clear to authorize the laying down any rules to guide our conduct.

† Sauvage mentions, that the Bath waters were unsuccessfully tried in this disorder, (if I understand him right;) but from his own account the time of stay was too short for a fair trial.

GENUS LXXXVI.

ICTERUS.

Aurigo calculosa. Sauv. sp. 9.

The baths of this place are here an excellent remedy.

Aurigo ab obstructione. Sauv. sp. 6.

Warm bathing is undoubtedly proper here.

Aurigo rachialgica. Sauv. sp. 14.

Bath waters, externally used, are very proper for the relief of this symptom.

CLASSIS IV.

LOCALES.

ORD. II.

DYSCINESIÆ.

GENUS CI.

CONTRACTURA.

Contractura dolorifica. Sauv. sp. 2.

———— *scorbutica.* Sauv. sp. 3.

———— *paralytica.* Sauv. sp. 4.

———— *rachialgica.* Sauv. sp. 5.

Y

In

Table of Diseases.

In all these bathing in the Bath waters must undoubtedly be adviseable.

ORDO IV.

EPISCHESES.

GENUS CVII.

OBSTIPATIO.

GENUS CVIII.

ISCHURIA.

In many instances, where these occur from spasmodic causes, the Bath waters thus applied are likely to prove an efficacious remedy.

ADDITIONAL EXPERIMENTS *to those*
contained in Vol. I.

EXPERIMENT I.*

AT the place where the springs rise in the baths, numerous bubbles of air are observed to ascend along with them. A quantity of air of this kind was collected at the King's bath, by inverting a glass, and holding it over the bubbles as they rose, and then conveying it into an inverted bottle, which, when full, was carefully corked up and carried away. The air thus obtained answered in every respect to fixible air, precipitating lime water, and having every other quality which that stance possesses.

Experiments made at the Hot Bath.†

When the late repairs were made last year at the Hot bath, it became necessary
to

* This experiment was made by my worthy and ingenious friend, Dr. Nooth.

† In the first volume of this work it is mentioned, that the lead cistern of the King's bath appeared much corroded on
Y 2 the

to dig down according to the course of the spring, and for some distance surrounding to a considerable depth. About the depth of 16 feet, and in the midst of ground, which was evidently artificial, lay two large rough-hewn stones, unequally placed one upon the other, and very near the place where the spring rose ; so that in its course upwards it had probably flowed between them. In the interstices between these was collected a considerable quantity, some pounds, I believe, of a dark-brown substance, adhering to the stone in a laminated form. This was intermixed with numerous small shining particles, and on the surface was shot into pointed crystals, or rather numerous congeries of small crystals

the inside by the water. This fact I find has been denied by some, and doubted by others. Not to insist on my own authority, (although I saw the piece of lead taken from the cistern, and examined it carefully immediately after) Dr. Harrington, of this place, a gentleman of undoubted veracity and medical reputation, was likewise a witness to it, and agrees perfectly with me in the above account. Many other authorities for this fact might be brought, as the piece of lead was brought into a public coffee-house, and there shewn to a great number of people. I have likewise been informed, that the pipe which supplies the Cross-bath pump is, without any marks of external violence, so worn away in many places by the stream of water passing through it, as to admit the impression of the finger from without, and is actually rent for several inches in one part by the same cause.

tals in various directions, some horizontal, others pointing obliquely upwards. It had no sensible smell.

EXPERIMENT II.

A small portion (about three grains) of the above-mentioned substance was held in the flame of a candle ; a suffocating smell, like that of a burning match, was immediately diffused to a considerable distance.

EXPERIMENT III.

I rubbed a bit of the same substance, and about the same size with that used in the foregoing experiment, over with tallow, and blew the flame of a candle on it with a blow pipe until it ceased to flame : I then powdered it in a glass mortar, and found most of its particles vigorously attracted by the magnet.

EXPERIMENT IV.

I powdered a few grains of the above substance very finely, and rubbed it over a piece of writing paper, and set it on fire : It emitted a sulphureous smell, and numerous bright sparkles, such as appear in fire-works, and are produced by mixing

Additional Experiments.

iron filings with the other combustible ingredients.

EXPERIMENT V.

On digging for the Hot bath, about 13 feet below the old bottom of the bath, and about 17 feet below the level of the adjoining ground, was found a bed of clay, of a dark-blue colour, which seemed to extend a considerable depth. An instrument, such as is used for boring in mines, was introduced to the depth of 7 or 8 feet, and still brought up the same substance. I procured some of the clay brought up in this manner; it smelt strong of sulphur when fresh, and was of a saponaceous consistence resembling marle.

EXPERIMENT VI.

Half an ounce of this clay was rubbed with three drachms of lixivium saponarium in a glass mortar, for the space of five minutes, when on smelling to it, a faint, tho' evident smell of hepar sulphuris was discovered.

EXPERIMENT VII.

Three ounces of this clay were put into a crucible, with a piece of bright silver stuck

stuck into the clay, and suffered to remain in the clay for about twenty minutes ; on taking the crucible out, a strong and suffocating sulphureous smell was very evident, so as to be perceivable at several yards distance, and to diffuse itself over the room. The silver was turned black in the part exposed to the air.

EXPERIMENT VIII.

A drachm of the compound before mentioned, viz. of the clay and the lixivium saponarium, was mixed with four ounces of water, and filtered off through paper after standing an hour. To the filtered liquor was added four drops of solution of silver, which caused at first some cloud, and on standing changed the colour to a deep purple, inclining to black.

EXPERIMENT IX.

A silver spoon continued stuck into the fresh clay three hours without any change of colour.

EXPERIMENT X.

A silver spoon was laid in the mixture of clay and water for four hours without any change of colour.

EXPERI-

Additional Experiments.

EXPERIMENT XI.

On 3ii. of the clay was poured 3i. of strong spirit of vitriol, diluted with 3fs. of water, a brisk ebullition ensued, with black bubbles, and a suffocating smell, exactly resembling the solution of iron in that acid.

EXPERIMENT XII.

To 3ii. of distilled water were added twenty grains of the solution in the last experiment, and to these put fifteen grains of tincture of galls. Little change of colour was perceived 'till a few drops of lixiv. tart. were added, which immediately produced a dark purple colour.

EXPERIMENT XIII.

Three ounces of the clay were put into a small glass decanter with eight ounces of water, corked up, and set in a pan of water, and put upon the fire. After continuing about a quarter of an hour, when the water began to boil in the pan, the cork of the bottle was thrown out with great violence. It was then taken from the fire, and after settling, about one ounce
of

of the clear part was poured off, and to it added four drops of tincture of galls. No signs of any alteration of colour appeared.

EXPERIMENT XIV.

I conveyed a stream of fixible air on the surface of the remaining clay and water, by means of a bended tube, and then pouring off an ounce of the clear part, added four drops of tincture of galls: A purple colour was struck immediately: I repeated this after the water had stood half an hour, without its producing any change of colour.

The above experiments tend to confirm what has been before said in the first volume, of the sulphureous matter being in a state of actual solution in the water, contrary to what Dr. Lucas has asserted. The congeries of pyrites was in a crystallized state, (an evident mark of its having been in a state of solution) lay in the current of the spring, and must have been deposited by it, as the stones between which it was found were both hewn, and probably their date might be nearly ascertained,

tained, at least, that the time of their being laid there was probably not more ancient than the Romans leaving Britain, as they were found in the midst of an old Roman bath, surrounded with ruins of Roman antiquity, as capitals of pillars, an altar, and other remains of architecture in that style. Several coins also were found, but none that I saw were later than Constantius, or older than Nero: The former of these came to the throne in the year 337, and died in 361; so that the former of these dates must be the greatest length of time they could have been there; but probably it was about a century later, in the time of Valentinian III, when Britain was separated from the Roman empire, and the barbarians destroyed the ancient monuments of the grandeur of that people.

The experiments need but little remark: The sulphur and iron both appear to be contained in large quantity in the strata of earth, thro' which the spring rises; but whether the latter acquired these substances from the water, or the water was impregnated from them, is not clear. It may seem remarkable, that in the substance deposited by the water no calcareous
earth

earth should be found, since I have mentioned that as the substance which holds the sulphur suspended, and which, on standing is actually deposited from the Bath water.

But this precipitation is of a very different kind from one that could happen in the open air; and, I believe, the reason why the earth was not precipitated here is, that it was held in solution by the fixible air in the water, which, when the water is exposed to the air of the atmosphere, is dissipated, and the earth loses its menstruum, or body, that dissolved it, and is of course precipitated. But this, it is obvious, could not happen in the earth. The union of sulphur with water, by means of calcareous earths, is very incomplete; and the former is constantly separating, and attracts part of the iron along with it, as appears in the experiments related.

The sulphur precipitated here appears in form of pyrites, as iron is an ingredient in the waters; but at Aix-la-Chapelle, where there is no iron, it is precipitated in its simple state.*

I have

* Vide Dr. Williams's Treatise on the Aix-la-Chapelle waters.

Additional Experiments.

I have thus finished what I have to say on the subject of the Bath waters.

I have been more solicitous to ascertain the effects of the waters, and to point out their general indications, than to lay down every particular circumstance in which they may be of service, or otherwise. To do this, would be a most laborious and almost endless work, and much too large to come within the plan of the present undertaking.

I have, indeed, selected the several species of disorders as laid down by authors; but these are again much compounded with one another, and seldom appear so simple as described. But though they do not exactly answer, they may be of great use in ascertaining the general nature of the disorder, and the propriety of the use of this remedy, from analogy of its success in similar cases.

All the experiments cited were made under my own observation, except those where the authority is quoted. I have been careful to insert none of whose authenticity there can be any doubt, as they were

were made by persons of the utmost judgment in making the experiments, and veracity in relating their event.

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